FoodCASE v 1.4.4

User Manual for Data Compilation

Compiler Client Module

Prepared by Janka Porubska

A few words to the work on the manual
Manual has been elaborated based on the contract between Janka Porubska and EuroFIR AISBL. The main goal was to describe the main functionality of FoodCASE software - compiler module, in order national compiler organisations can use it for national food composition databases.
Since the application is regularly updated and not all buttons and menu options are working yet, there are empty spaces left with indications that the procedure and description of work need to be completed or clarified.
Operations that were not completely clear, because I could not check their functionality from the user point of work, I left highlighted in red colour.

The style and structure of the manual was inspired by already existing instructions on the FoodCASE webpage on Wikipedia prepared by Paolo Colombani and Ian Unwin. Some descriptions were taken from the website and from the software specification document and completed with pictures of user interface.
The pictures of user interface presenting individual steps of procedures were taken from the web application during several months, so not all of them have the actual version (1.1.4) in the header.

Due to the integrity and logical relations of the manual there are introductory and general chapters included in this draft, however, this information should form a part of the second manual about administration tool and controls.

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1 Introduction

1.1 What is FoodCASE

FoodCASE (**F**ood **C**omposition **A**nd **S**ystem **E**nvironment) is a computerized food information management system that merges standardized rules and provide an environment for harmonized food composition data (FCD) compilation.

1.2 Background

Food composition data are essential for a variety of purposes in many different fields of work (e.g. assessment of nutrient intake, development of dietary guidelines, planning diet for schools, hospitals, etc.) (Williamson, C. S. and Buttriss, J. L., 2007). In order to data compilation process and quality assessment were conducted in a uniform way a standard framework has been developed in EuroFIR (http://www.eurofir.eu). Computerized compilation process minimizes risk of data inconsistency, poor data quality, incorrect use of component values or algorithms and not last but least saves manual work and prepares a good base for data publishing.
The FoodCASE database architecture was adapted to standards defined by EuroFIR, thus enabling a standardized data interchange with data requesters (e.g. EuroFIR eSearch facility). FoodCASE not only supports the compilers with data management tasks, but also enables them to control different quality aspects (Colombani, P. et al., 2009). The software was built according to a modular philosophy, i.e. enables a further development of new features without the need to modify the software substantially. FoodCASE is a research project at the Swiss Federal Institute of Technology Zurich (ETH Zurich) (Presser, K. et al., 2008).

1.3 Utilization

- Production of standardized food composition database for publication,
- FCD quality assessment,
- FCD interchange and comparison (eSearch facility),
- Retrieval document system.

1.4 Standards

There are specification documents and papers that describe standard compilation procedure listed in the chapter *References and Standards.*
The main topics that are covered:

- Individual compilation steps (Greenfield, H. and Southgate, D. A. T., 2003; Westenbrink, S. et al., 2009; Reinivuo, H. et al., 2009),
- The specification of the computerized systems (Becker, et al., 2007; Becker, et al., 2008),

- Data quality evaluation (Oseredczuk, M. et al., 2009),
- Data interchange (Pakkala, H. et al., 2010).

More documents and recommendations are available at http://www.eurofir.eu.

2 About the Manual

This manual gives instructions for conducting particular steps of data compilation procedure in FoodCASE, the Compiler Client Tool.

The manual is divided into several sections reflecting data flow from the very beginning (entering single foods and values) to publishing and data export. However, the graphic user interface itself is designed logically and leads compiler to work “from the left to the right”. Particular steps of data management can be conducted individually. There is no need to go through the instructions sequentially chapter by chapter. Users can start work with each section independently on each other.

All pictures used for outlining functionalities of FoodCASE and presenting examples with data documentation were prepared in the *Metal Look&Feel* design. User interface may not necessarily be identical with your customary interface.

3 Login and Exit

3.1 Login

For starting the application you need a personal user name and a password (Figure 3.1-1). The login data are case sensitive. As soon as the user is logged in, all operations (inputs or modifications) are recorded under the registered name. Change of logged user is possible by closing the application and entering new registering data.

Figure 3.1-1

If user name and/or password is not correct error message displays (Figure 3.1-2). Number of login attempts is not limited.

Figure 3.1-2

3.2 Exit

To exit the application use one of following:

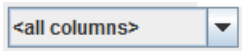
- Click the *Menu File → Quit (Ctrl+Q)*,
- Use the **Ctrl+Q** keys,
- Click the“x” sign in the upper right corner of the main screen.

4 Getting Started

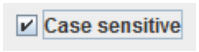
4.1 Graphic Controls

Arrow buttons (horizontal) - hide and open Search area and Clipboard.

Arrow buttons (vertical) – enables showing and hiding query dialogs in the Search area and quality categories in quality assessment section of the Single value detail window.



Drop-down list – displays a list of available descriptors, columns, categories, properties or records and enables choosing one item from the list.

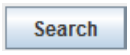


Check/tick box – represents one of two values - “*True”* or “*False”*. Tick in the check box field indicates *“True”*.

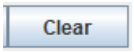
Select from thesaurus/index, search in folder – opens standardized thesaurus, data table or folder and enables searching in it and select descriptor, record or file.

Radio button – only one option is allowed, usually it is applied for searching feature as an operator or for

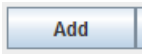
unambiguous answering a question.



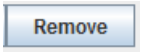
Search button (filter) – initiates searching of information based on defined criteria.



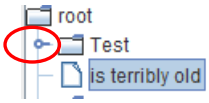
Clear – clears all searching criteria and shows all available data (e.g. clears all items from the Clipboard, clears all items from the Query Build window in Marker query dialog).



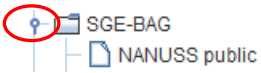
Add – moves selected term to the Query Build window in Marker query dialog.



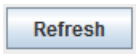
Remove – removes selected term from the Query Build window in Marker query dialog.



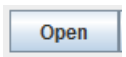
Expand tree – opens a branch of the tree at different levels of tree.



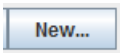
Collapse tree - closes a branch of the tree at different levels of tree



Refresh – clears all search criteria and reloads actual data from database.

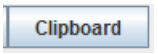


Open – displays details of selected item (row) in particular section of the central working area,
- downloads selected picture from folder in local computer to be displayed for food.



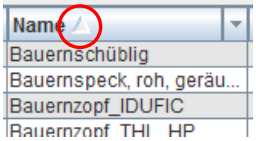
New – opens window for adding new record (i.e. single food, single component value, recipe and reference).

Duplicate – enables copying and pasting component values between single foods or within the same single food,
- enables duplicating data quality analysis tree in the Data Quality Analysis Toolkit.

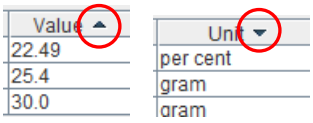


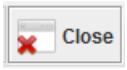
Clipboard – moves selected items (rows) into the Clipboard.

Ascending/Descending Order – click on a header of any column sorts data in table in either ascending or descending order corresponding to the selected column.

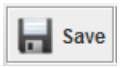


Note: Numbers are ordered first, then letters are ordered based on English alphabet and special letters (e.g. ä, š) are ordered in the end of the list.

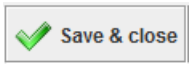




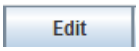
Close – ends up work in detail window of a record and abandons it. If a particular record has been modified, a control question asking on saving changes or not precedes closing the window.



Save – saves changes made on a record and leaves the detail window of the record open.

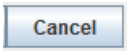


Save and close - saves a change made on a record, ends up work in detail window of the record and abandons it.

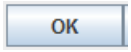


Edit – displays details of selected item (row) in particular section of the central working area and makes it accessible for modification.

Selection arrow button – moves selected items from list of markers to a record. Multiple selections are possible.



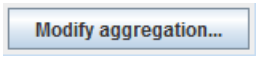
Cancel – cancels selected option without any change.



Confirm – confirms the process or action.

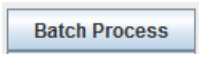
Searched text – field for entering information that is searched.

Memo field – field for recording free text strings in unlimited number of characters. When number of inserted characters exceeds displayed size of field, then scrolling through data is possible.



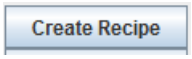
Modify aggregation – opens a window in which aggregation parameters can be modified (e.g. adding/removing single values, modifying calculation methods and matrix unit).

Create Aggregated Food – initiates aggregation of single values stored in the Clipboard and opens a window for specification of aggregation parameters.



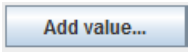
Batch Process - opens a window in which identical information can be added to a set of single values listed in the Clipboard (e.g. identical value, marker, reference or remark, etc.).

Note: The operation must be carried out with care.

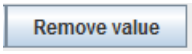


Create Recipe – opens a window for recipe creation based on aggregated foods listed in the Clipboard.

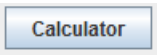
Open in Data Quality Analysis Toolkit – the button activates a special module in which data quality analysis can be conducted (e.g. consistency check).



Add value… - opens a window for adding single (contributing) value to aggregate food. The button is available for both specification new aggregated food and modification of the existing aggregated food.



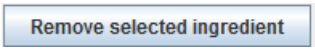
Remove value – removes selected single (contributing) value from aggregated food.



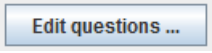
Calculator – opens a window for calculation individual yield factors for water, fat and alcohol.

Revalidate – revalidates data quality evaluation after corrections are made in recipe specification including single and/or aggregated foods (and window for modification recipe is still open).

Add new ingredient – opens a list of foods that can be used as ingredients for recipe calculation.



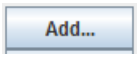
Remove selected ingredient – removes selected ingredient from recipe.



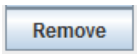
Edit questions … - opens window for scoring quality categories and attribution of quality index to single value.

Yes - confirms selected option or operation.

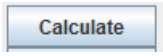
No – refuses (cancels) selected option or operation.



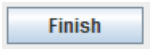
Add… - opens a window for selection of thesauri descriptor (e.g. cooking method in recipe, food group in single food) or data record from list of records (e.g. contributing value and reference in aggregated food).



Remove – deletes selected thesauri descriptor or record from particular field (e.g. cooking method, food group, ingredient from recipe). It has opposite functionality to the Add… button.

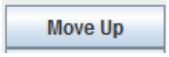


Calculate – carries out recipe calculation.

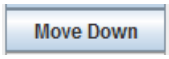


Finish – recalculates aggregated foods when aggregation parameters are modified.

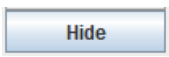
Save and close – saves scores of quality categories, closes the window for quality evaluation and calculates the quality index of single value.



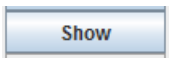
Move Up – moves selected column or group of columns “up” (to the higher position) in the advanced option of the column customization function. It affects ordering of the columns in table and helps to change priority of column position and its display on visible part of the central working area.



Move Down – moves selected column or group of columns “down” (to the lower position) in the advanced option of the column customization function. It affects ordering of the columns in table and helps to change priority of column position and its display on visible part of the central working area.

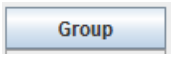


Hide – hides selected column or group of columns that is subsequently not seen in table at all. The button is available in the advanced option of the column customization function.



Show - shows selected (hidden) column or group of columns in table, however the column might not be

necessarily seen on visible part of the central working area. The button is available in the advanced option of the column customization function.



Group – forms group of selected columns (drag cursor over several items) in the advanced option of the column customization function.

Ungroup – dissociate columns from grouping in the advanced option of the column customization function.

4.2 General Functionalities of Main Registers

4.2.1 Column Customisation

The columns of each panel in the central working area are customisable. One can move the displayed column to a desired place in the table by clicking on the head of the column and drag it to the desired position (Figure 4.2.1-1 and 4.2.1-2). Further, one can select the columns to be seen by right click on any column head (Figure 4.2.1-3).

Right click on the head of a column and click *More…* option activates advanced options which enables:

- Hiding/showing columns or column groups (**Hide** and **Show** buttons),
- Grouping columns and working with them as an individual block (drag cursor over selected columns and click **Group** button) (Figures 4.2.1-4 - 4.2.1-6),
- Ungrouping columns (**Ungroup** button),
- Arranging columns and column groups position outside or within the group (**Move Up** and **Move Down** buttons) (Figure 4.2.1-6 and 4.2.1-7),
- Setting horizontal scroll (Figure 4.2.1-8 and 4.2.1-9),
- Setting width of selected columns (in pixels) if for any reason you need to have a column with an exact width (alternatively change column with dragging its right edge with mouse) (Figure 4.2.1-10).

For arranging columns to the default settings, click the *Menu View → Reset Tables.* However, for groups of columns, ungrouping is needed before resetting table.

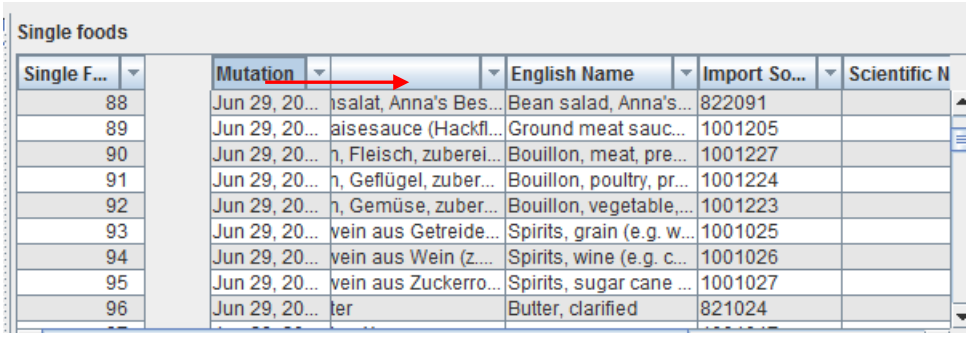


Figure 4.2.1-1

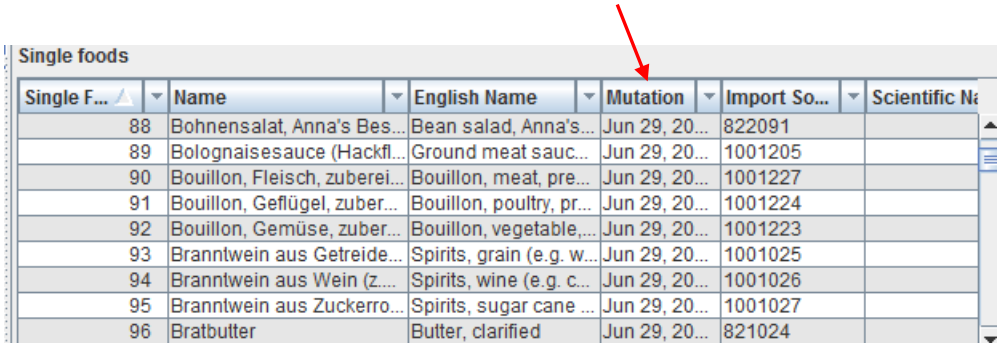


Figure 4.2.1-2

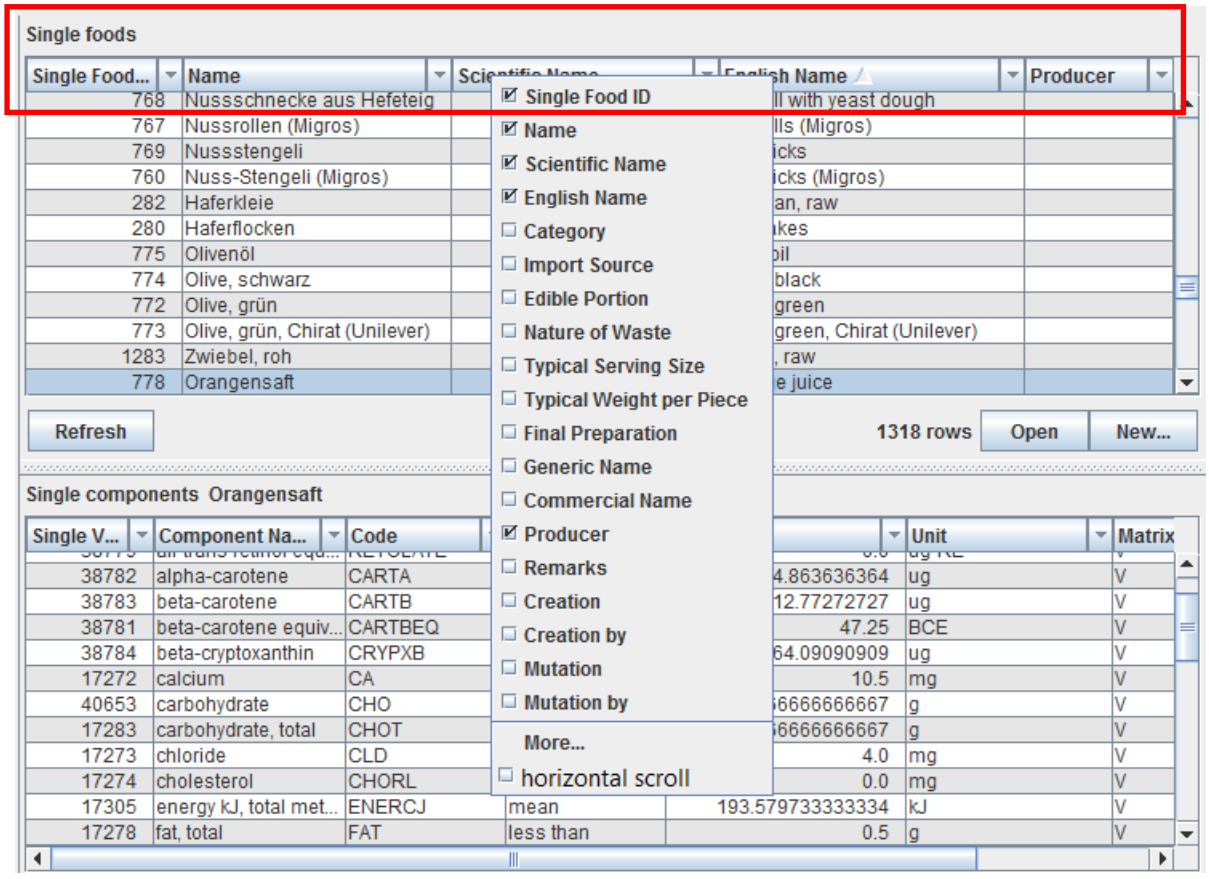


Figure 4.2.1-3: Ticked columns are displayed on the Single foods panel

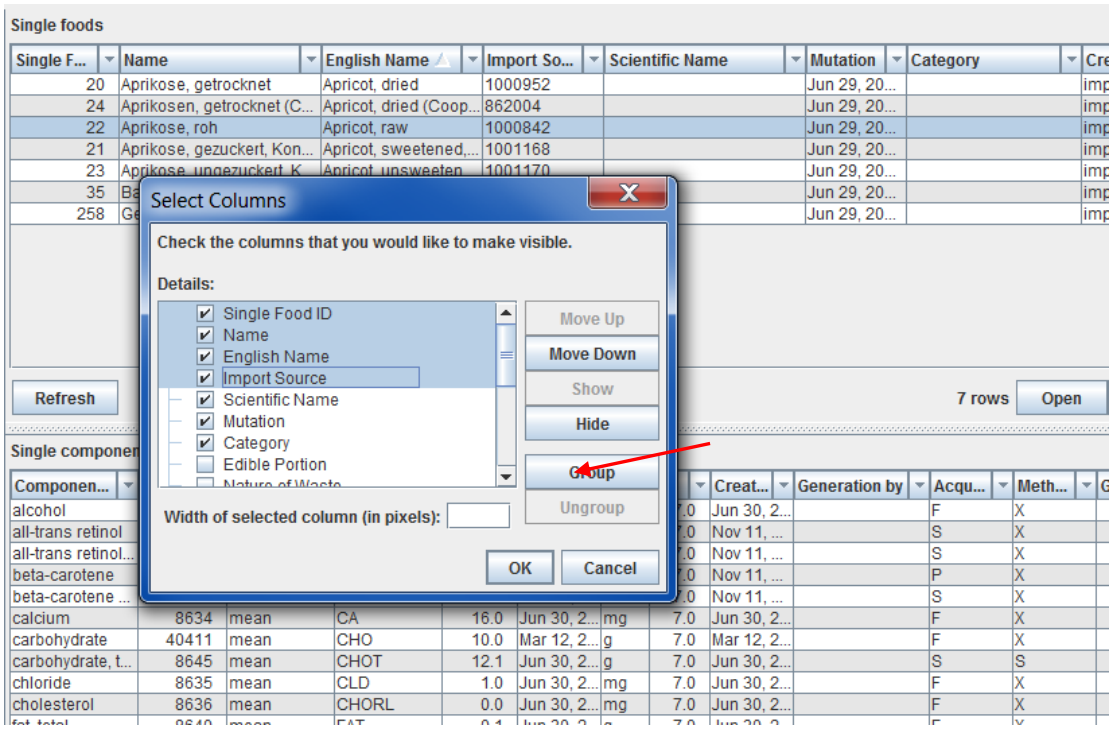


Figure 4.2.1-4: Grouping of main food identifiers in advanced options (via *More…* option)

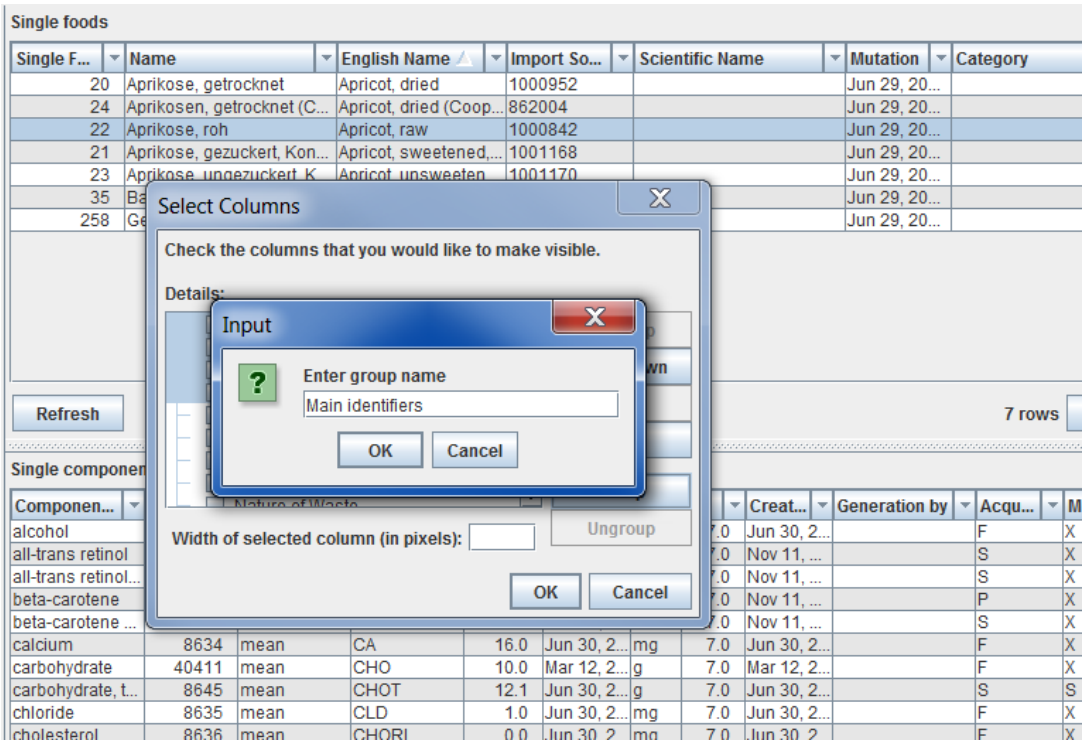


Figure 4.2.1-5

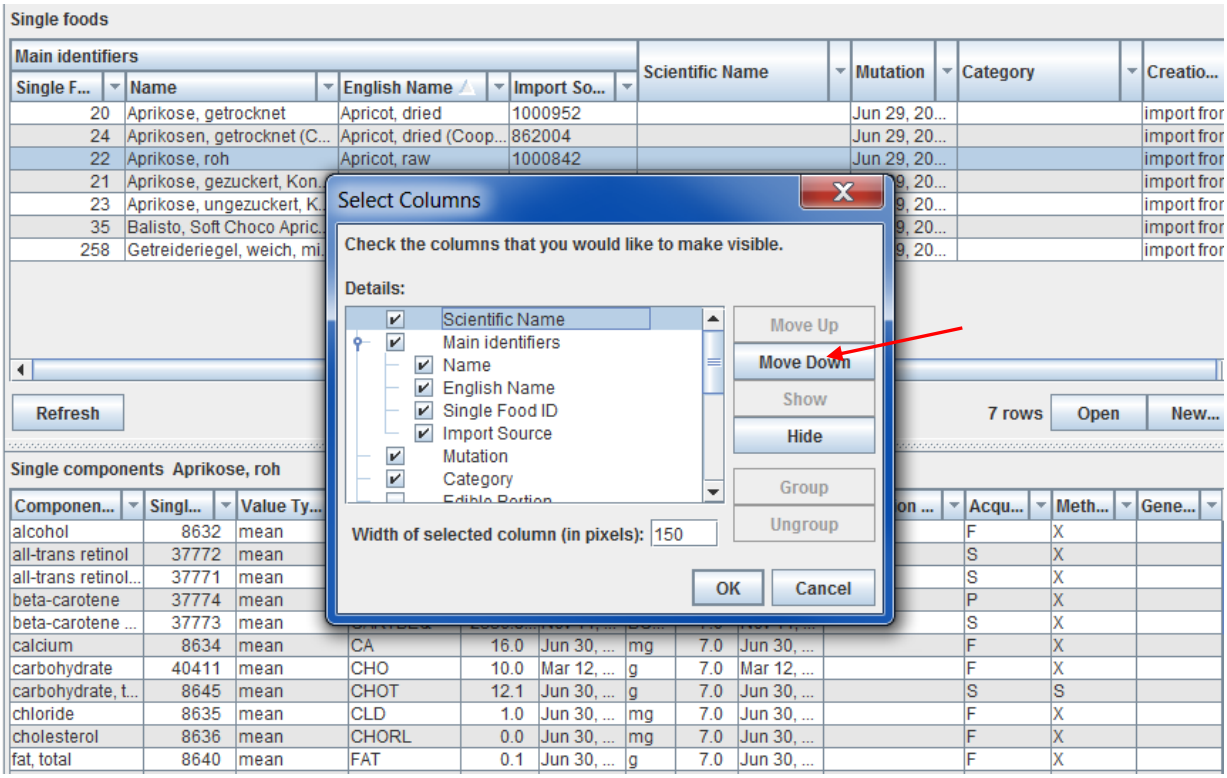


Figure 4.2.1-6: Arranging columns position using buttons **Move Up** and **Move Down** (e.g. *Scientific Name* moved to the leading position, *Single Food ID* moved to the 3rd position within the group)

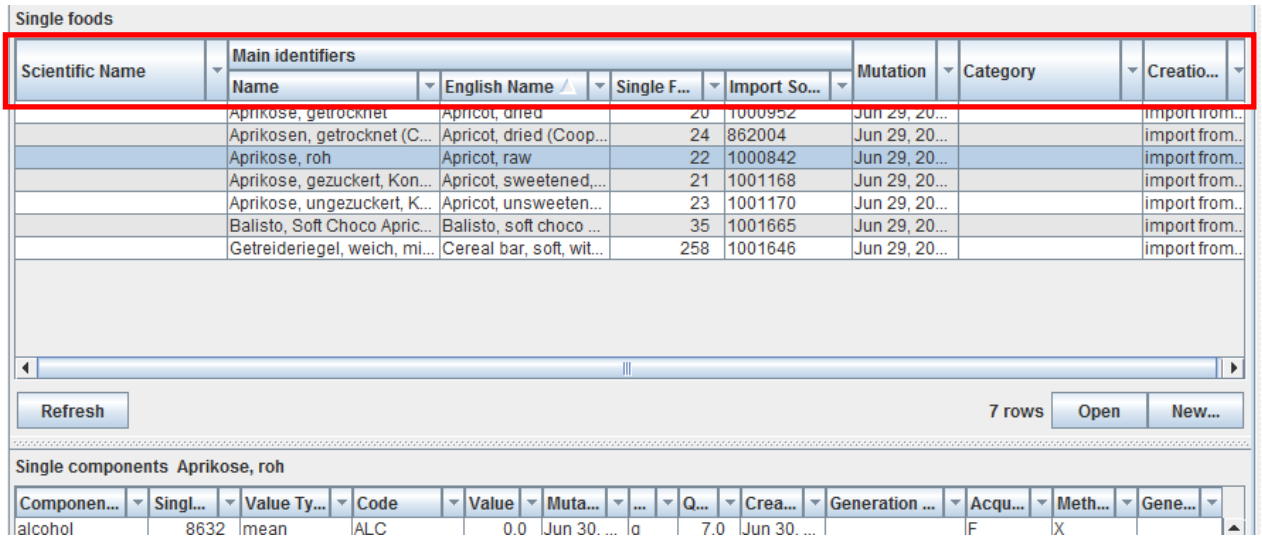


Figure 4.2.1-7: Modified columns arrangement

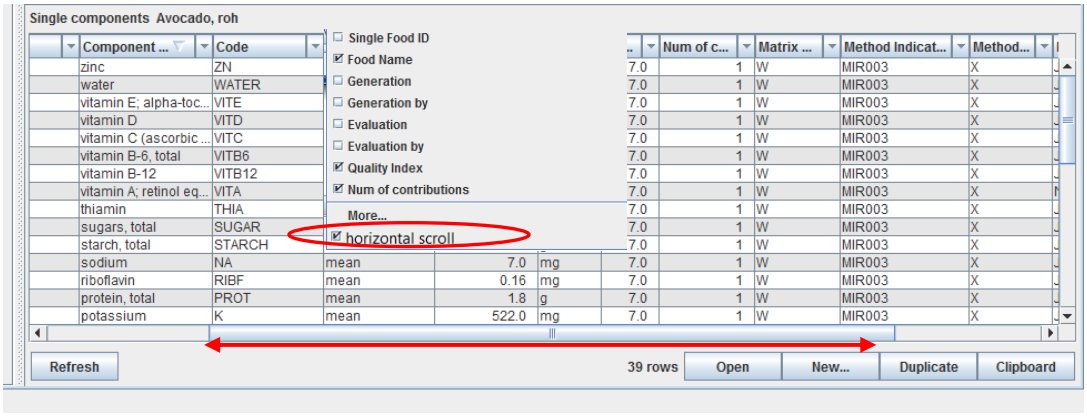


Figure 4.2.1-8: Ticked horizontal scroll results in displaying scroll bar

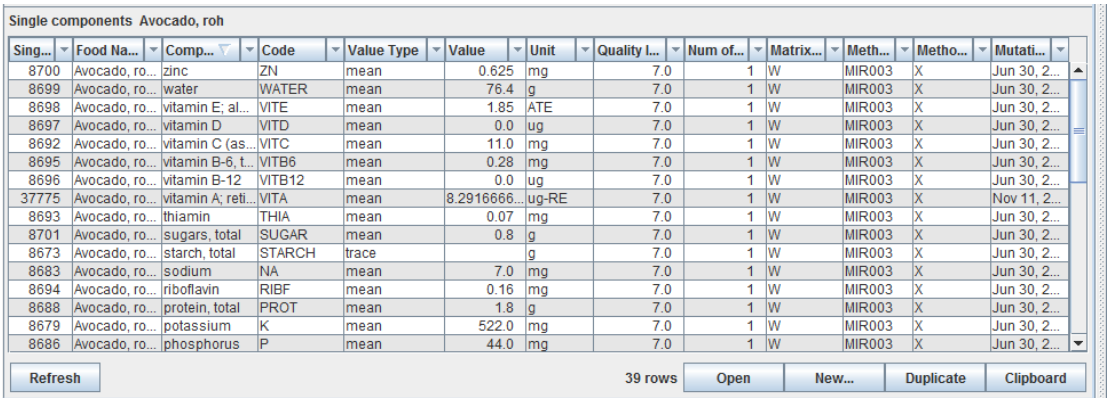


Figure 4.2.1-9: Not ticked horizontal scroll narrows width of columns
in order to be all visible on the working panel; readability of data in some columns is low

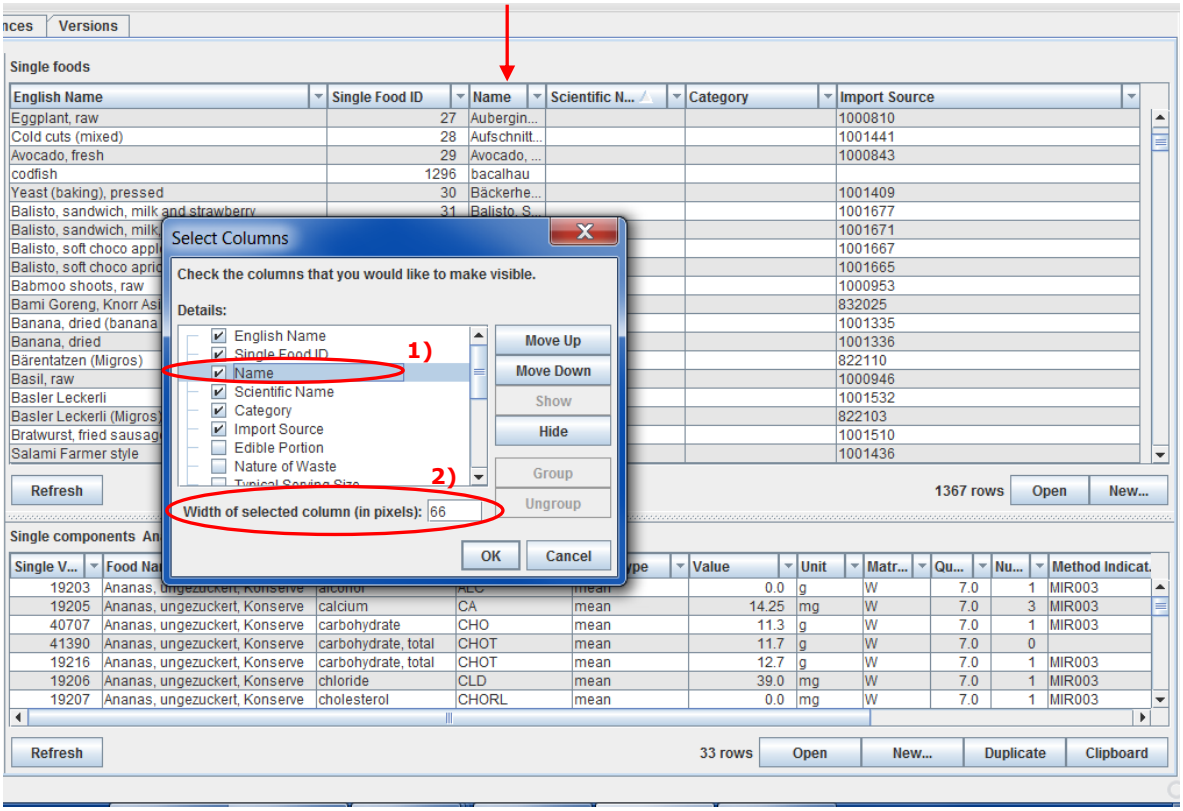


Figure 4.2.1-10: When setting width to a column, select a column first (1)

and then change number of pixels (2)

4.2.2 Context Menus

Right click on displayed information (row) opens context menus for quick selection of main actions (Figure 4.2.2).

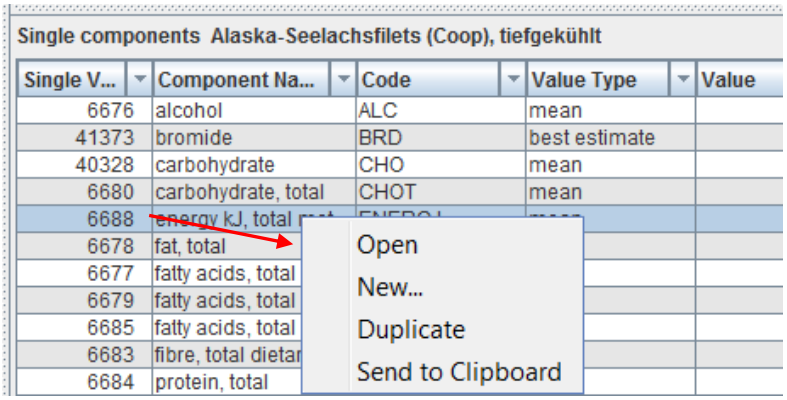


Figure 4.2.2

4.2.3 Multiple Selection of Rows

Rows can be selected concomitantly in a panel of the central working area:

- Rows lying next to each other - click on a row and drag the mouse over next rows (Figure 4.2.3),
- Rows not lying next to each other **–** press and keep **Ctrl** key and left click on individual rows,
- All rows **–** press **Ctrl+A** keys.

Multiple selection of foods in Single foods panel and Aggregated foods panel lead to display of all component values of selected foods at the bottom part of the central working area.

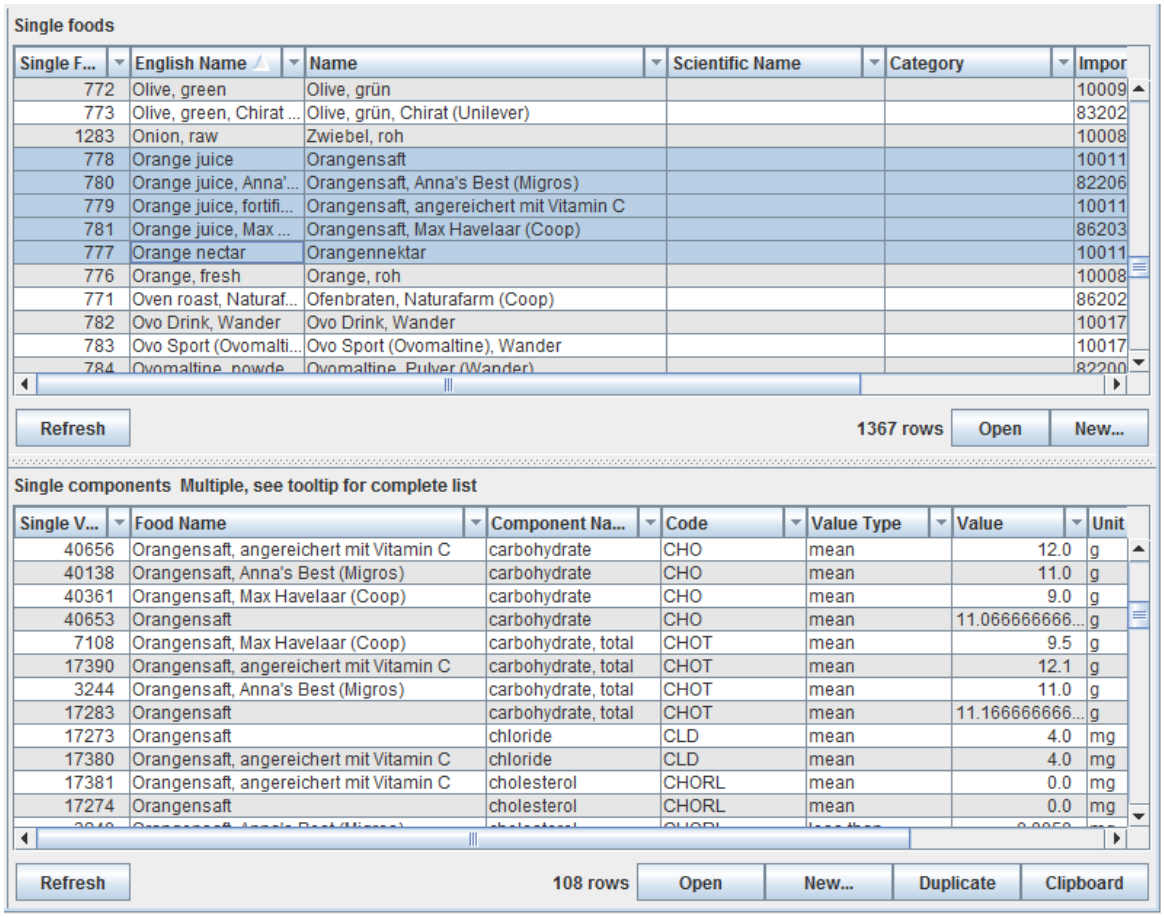


Figure 4.2.3: As soon as a multiple selection is applied for foods, corresponding values are displayed

4.2.4 Data Export

Selected rows or all rows can be copied using **Ctrl+C** keys and pasted using **Ctrl+V** keys in another application, e.g. MS Excel, MS Word, for further use. Only information from displayed columns is copied in this way.

Note: The function for a dataset export in particular format is not yet implemented in FoodCASE.

Simple Copy and Paste Exporting

"Exporting" (functions on all panels where the information is displayed in tables)

1. Activate the columns containing the information to be transferred (right click on any column header and select the column if it is not already displayed)
2. Select all rows to be transferred (use **Ctrl+A** keys if all rows are to be exported; for rows lying next to each other click on a row and drag the mouse over next rows; for rows not lying next to each other keep **Ctrl** key and left click on individual rows)
3. Copy the selected information with **Ctrl+C** keys
4. Go to the target application (e.g. MS Excel) and paste with **Ctrl+V** keys

Tip: With the help of the search functions for foods and/or components together with the filtering options (right click on column header) one can achieve basically every selection of foods/components possible to be "exported" (e.g. only foods in a certain food group with only selected components with only some part of the meta information).

4.2.5 Ascending/Descending Order

Left click on the head of the column orders rows in ascending or descending way.

Ordering is following: first are words beginning with numbers, second are words starting in English alphabet and special letters (e.g. ä, š) close the order.

4.2.6 Searching Functions

Extensive searching combinations are possible using both:

- Different search options in the search area,
- And the filtering options in the central working area.

Query Dialogs in the Search Area

There are different searching criteria available for each register (Figure 4.2.6-1).

Search query dialogs and Markers query dialogs can be used separately (Figure 4.2.6-2 and 4.2.6-3) or in combination (Figure 4.2.6-4).

For searching any term, following rules are set:

- Any part of the searched text string is possible to search,
- Just one letter or number is sufficient for filtering data,
- If case sensitive letter is ticked, result includes case sensitive letters in any part of the text string,
- Searching feature is applied on the whole data table including hidden columns.

Using markers for searching follows special rules (see chap. *4.3.1 Searching for Records Using Markers*).

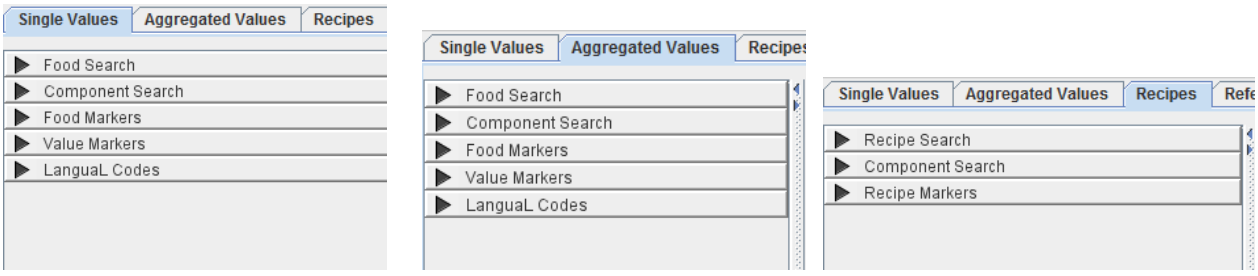


Figure 4.2.6-1: Single and aggregated data can be searched based on more criteria than recipes and references

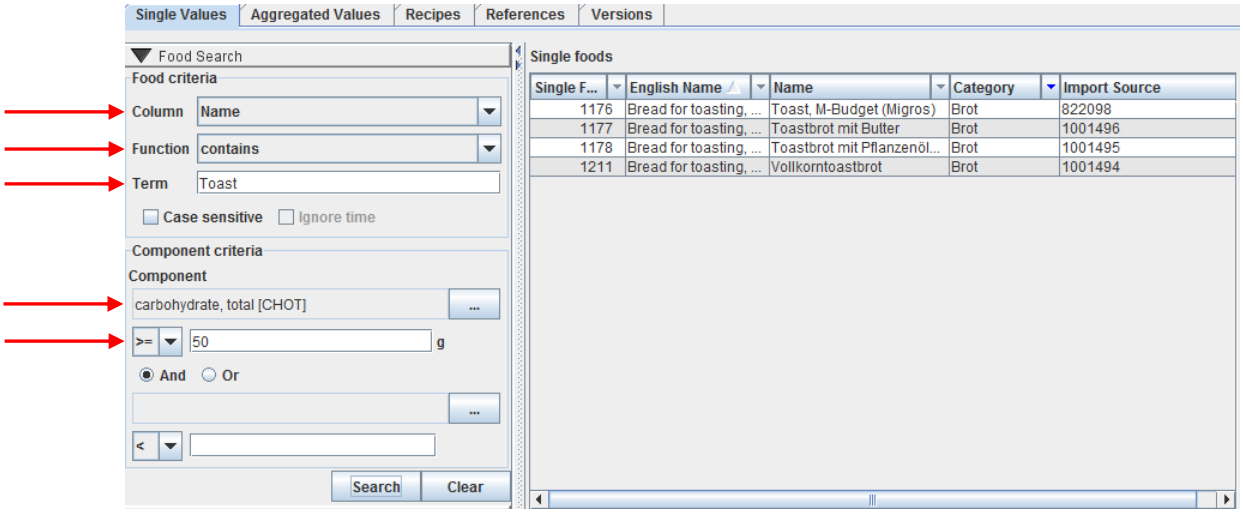


Figure 4.2.6-2: Searching criteria set for carbohydrate content in toast higher than 50g/100g

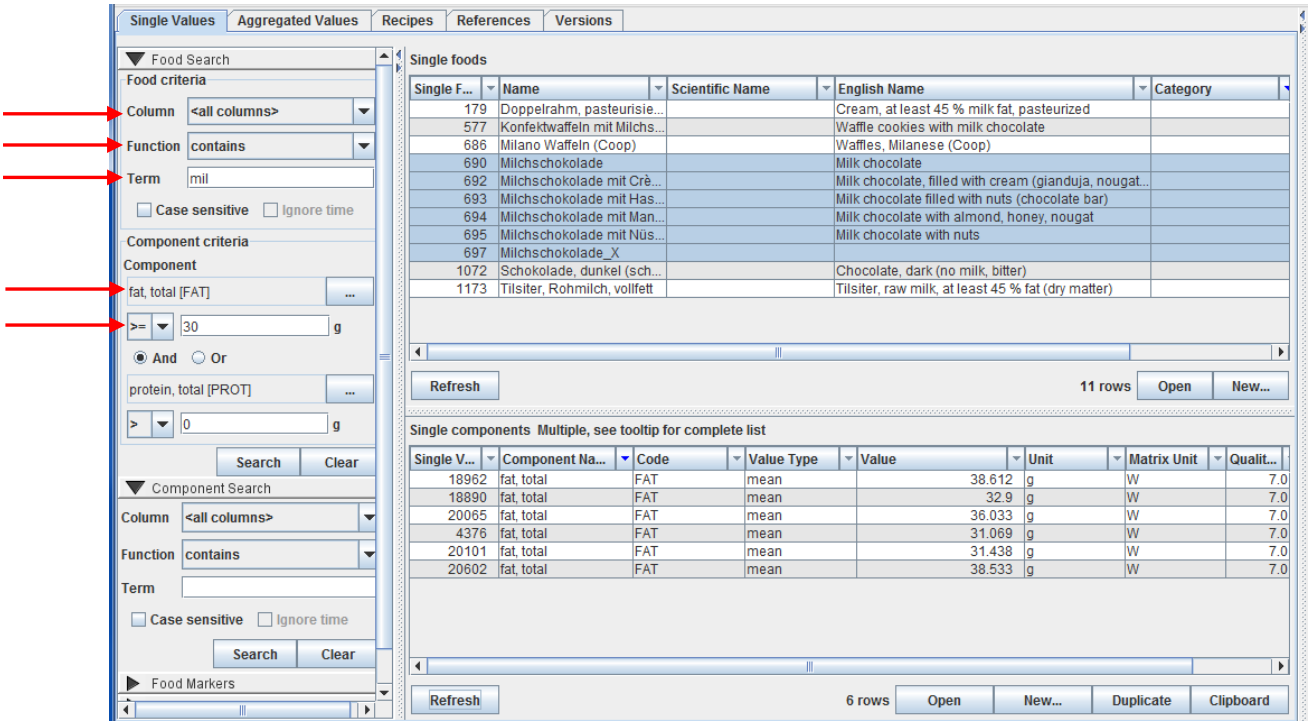


Figure 4.2.6-3: Dragging mouse over selected foods displays corresponding components in the lower part of the central working area

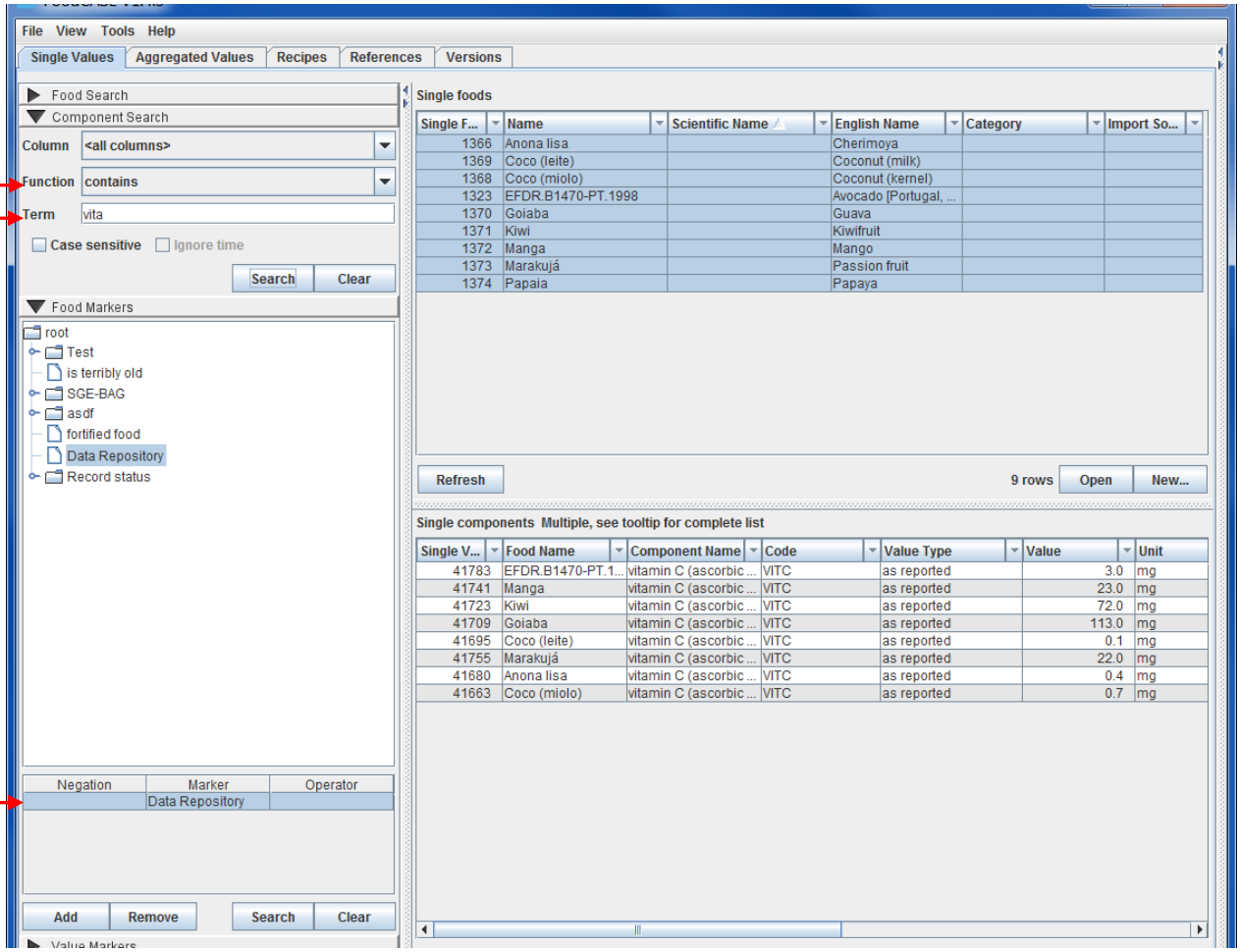


Figure 4.2.6-4: Combined Search and Marker query dialogs applied for data searching

Filtering Options in the Central Working Area

Activate drop-down list on column header to show filtering criteria specific to the column (Figure 4.2.6-5).

Advanced filter can be set to an individual column by selecting (Custom) functionality and using Custom AutoFilter (Figure 4.2.6-6).

Searching is applied in all columns including hidden columns if no specification for the column is defined (i.e. “<all columns>” criterion is chosen).

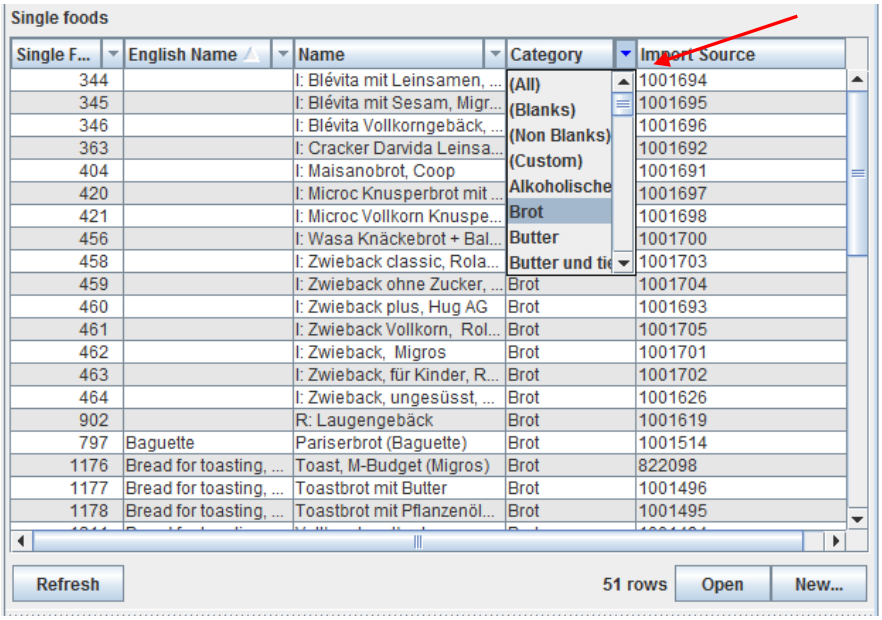


Figure 4.2.6-5

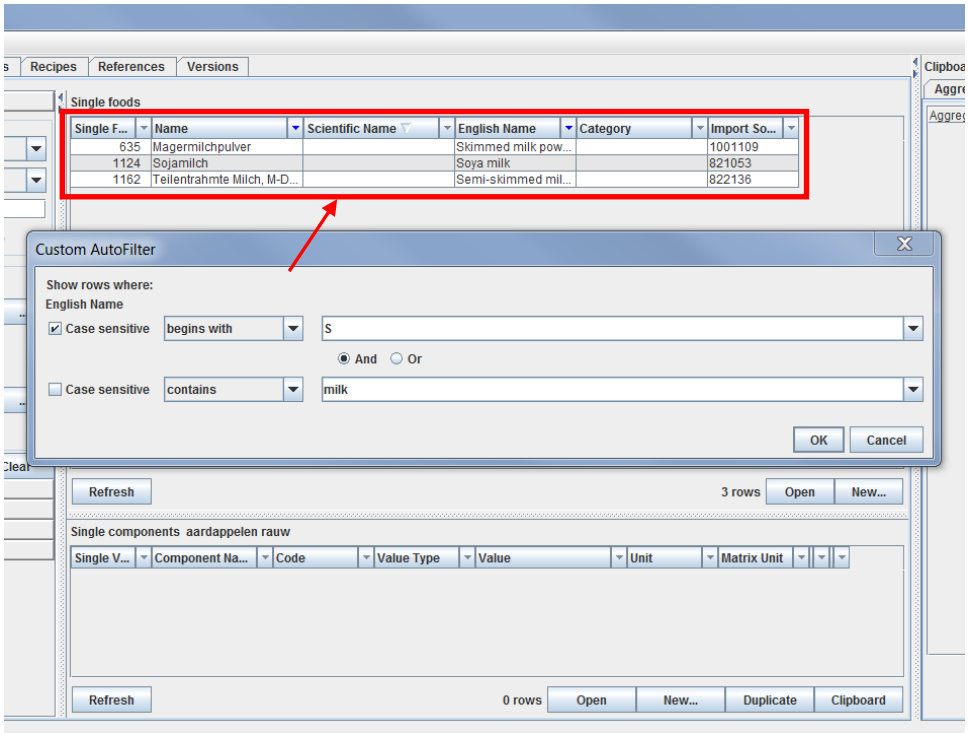


Figure 4.2.6-6: Filtered data based on given criteria in Custom AutoFilter

4.2.7 Deleting Record

Saved components, foods, recipes and references can be deleted. Deletion is irreversible. However, if there are different database versions produced then deletion of record concerns only current version and record remains stored in the older version (if it was part of an older version). While deletion of aggregated food from the database has no influence on single contributing values, deletion of single value affects composition of corresponding aggregated food.

Deleting procedure

1. Go to one of the registers
2. Double click on record you want delete or click related **Open** button
3. Click the *Menu File* → *Delete* (Figure 4.2.7-1)
4. Confirm deletion by clicking on the **Yes** button (or the **No** button if deletion is not desired) (Figure 4.2.7-2)

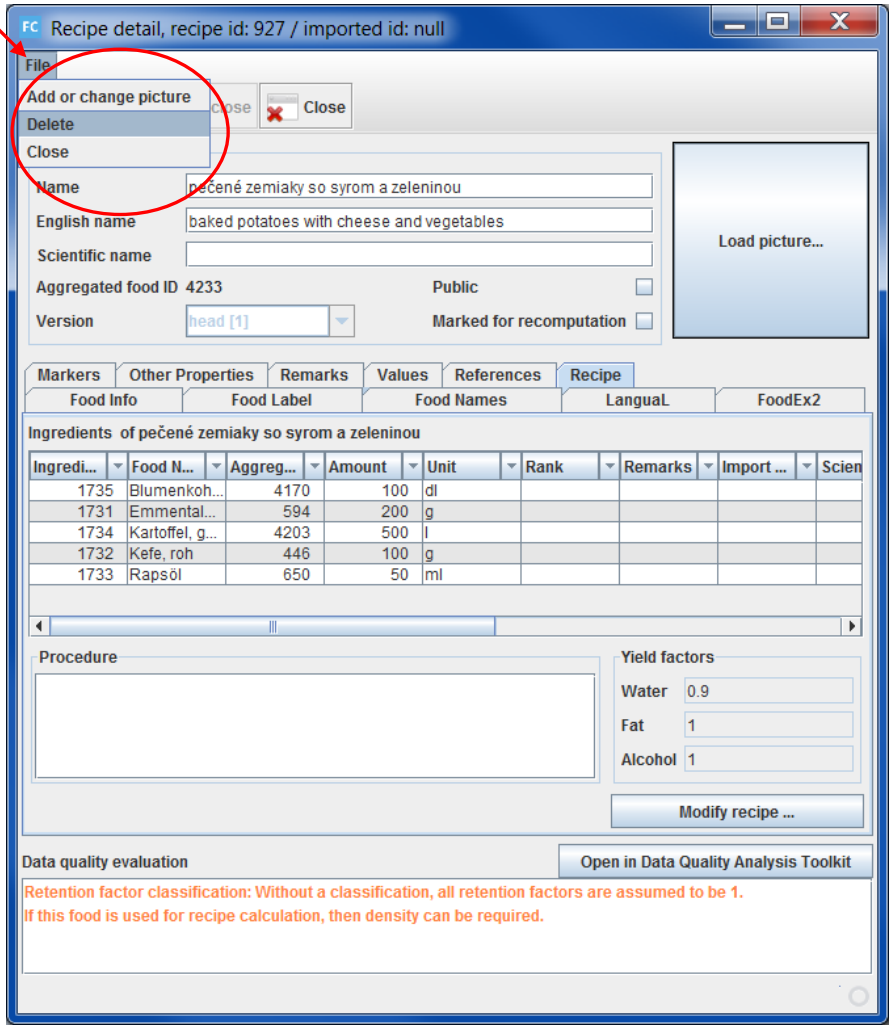


Figure 4.2.7-1

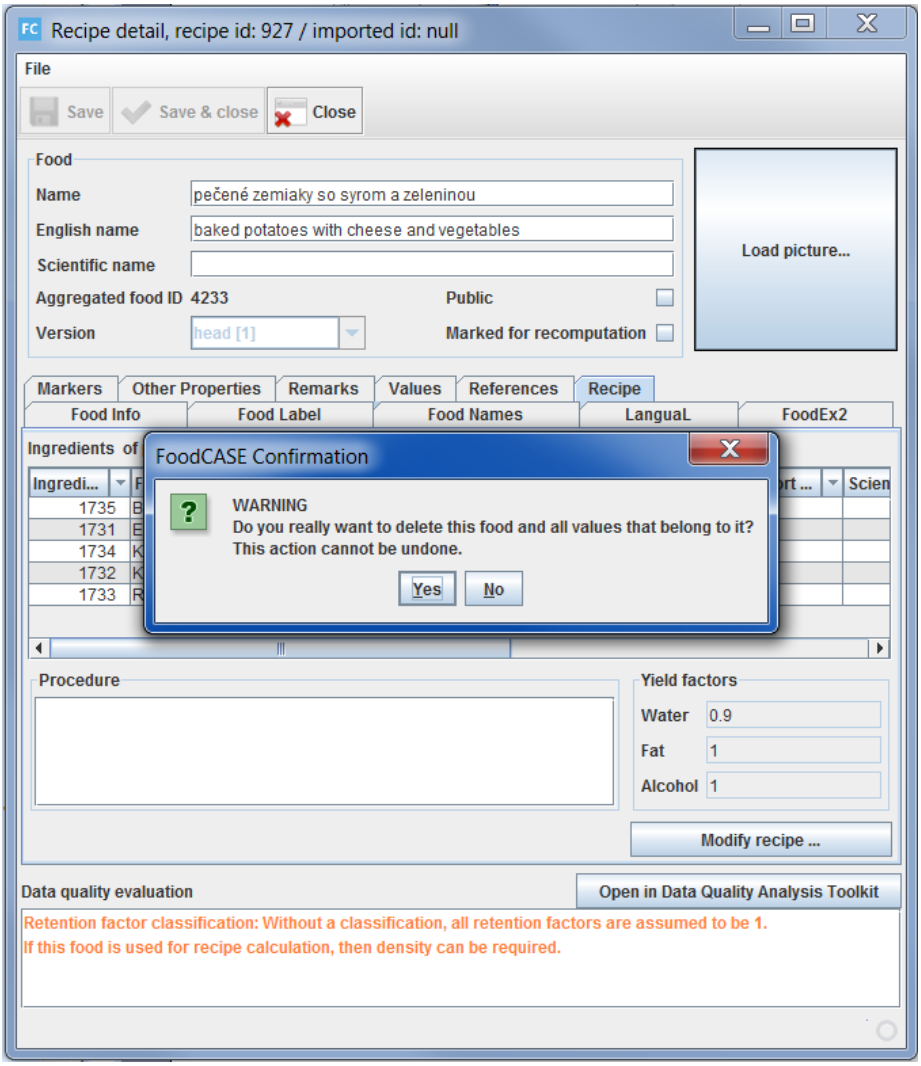


Figure 4.2.7-2

4.2.8 Colour Conventions and Indicators

Black colour – active fields, bookmarks and information mostly accessible for modification,
Grey colour – information, bookmarks or buttons not accessible for modification or use,
Orange texts – warnings indicating recommended information that is missing and thus decreasing data quality,
Red texts – warnings indicating mandatory information that is missing,
Red fields – indicate mandatory information that must be completed otherwise information is not stored.

4.3 Markers

Markers are indexing terms used to identify food items or compositional values according to specific criteria. They can be assigned in the Compiler Client module, after they have been defined in the Administration Tool.

Individual markers can be assigned to a Group, providing a simple hierarchy that allows different terms for the same criteria to be listed together. For example, a collection of multinational data might have a Group called "Country" containing Markers for each country to indicate the source country for each item of data.

Each Marker is specified as available for one or more specific types of record, these being:

1. Single Food
2. Aggregated Food
3. Recipe
4. Single Value
5. Aggregated Value

4.3.1 Searching for Records Using Markers

Appropriate **Food Markers** and **Value Markers** can be searched on the *Single Values* and *Aggregated Values* register, and **Recipe Markers** can be searched on the *Recipes* register.

Opening Marker query dialogs

Click on the appropriate Marker arrow (Figure 4.3.1-1).

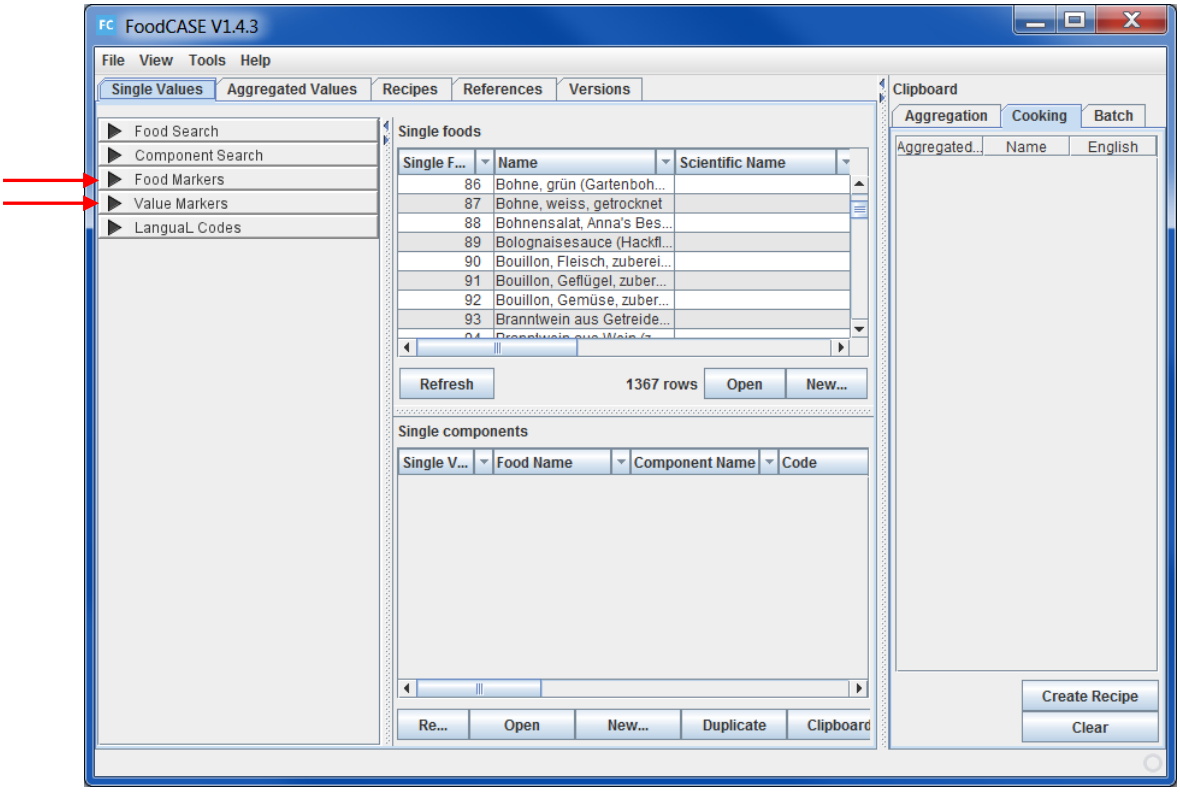


Figure 4.3.1-1

Selecting Marker for query

Click to select a Marker, which may be directly listed or within a Group such as "Value status" that needs to be expanded (Figure 4.3.1-2).

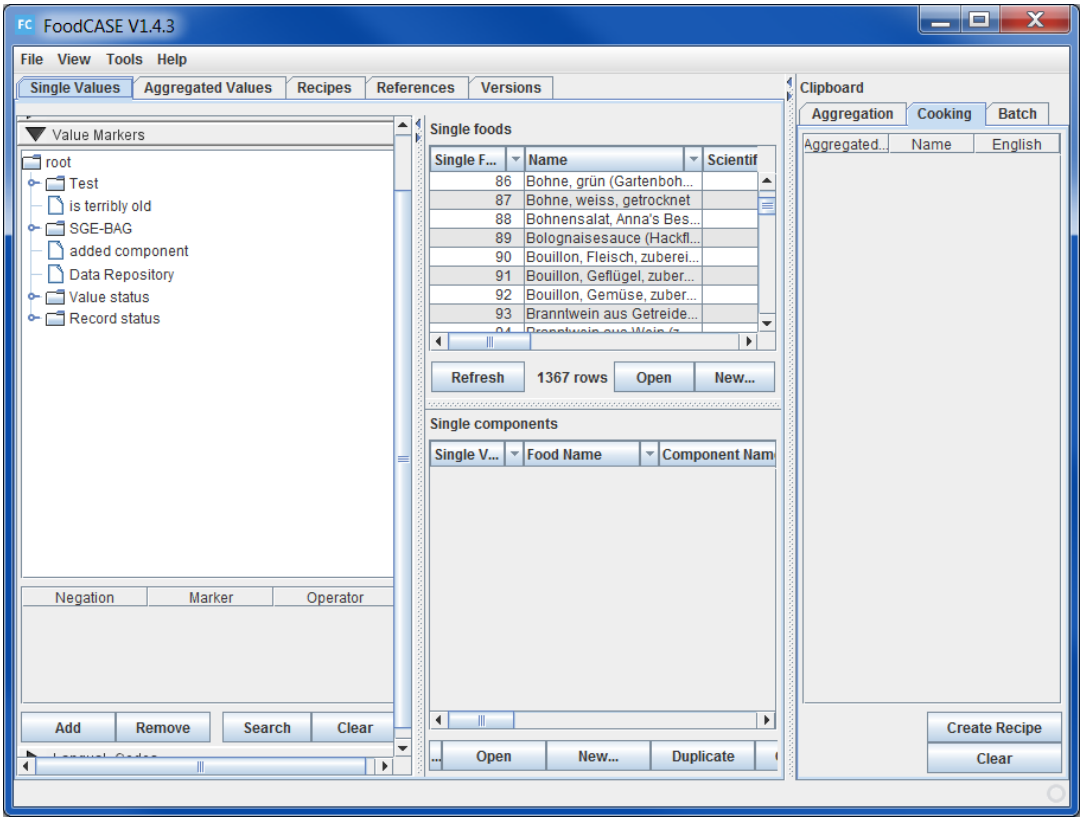


Figure 4.3.1-2

Building the search query

Having selected a query term, move to the Query Build window, which is below the Marker selection window (Figure 4.3.1-3).

To add the selected term to the query, click the **Add** button. Further terms may be selected and added to the query.

To remove a term from the Query Build window, select its row and click the **Remove** button.

To negate the term in the query (i.e. the results should NOT include records with the selected Marker), click alongside the term in the **Negation** column and select the **NOT** option.

To apply a Boolean operator to the search term (e.g. so that the terms X and Y are searched as "X OR Y" or "X AND Y"), click alongside the term in the **Operator** column and select the **And** option or the **Or** option.

To initiate the search, click the **Search** button.

To remove all the terms from the Query Build window, click the **Clear** button.

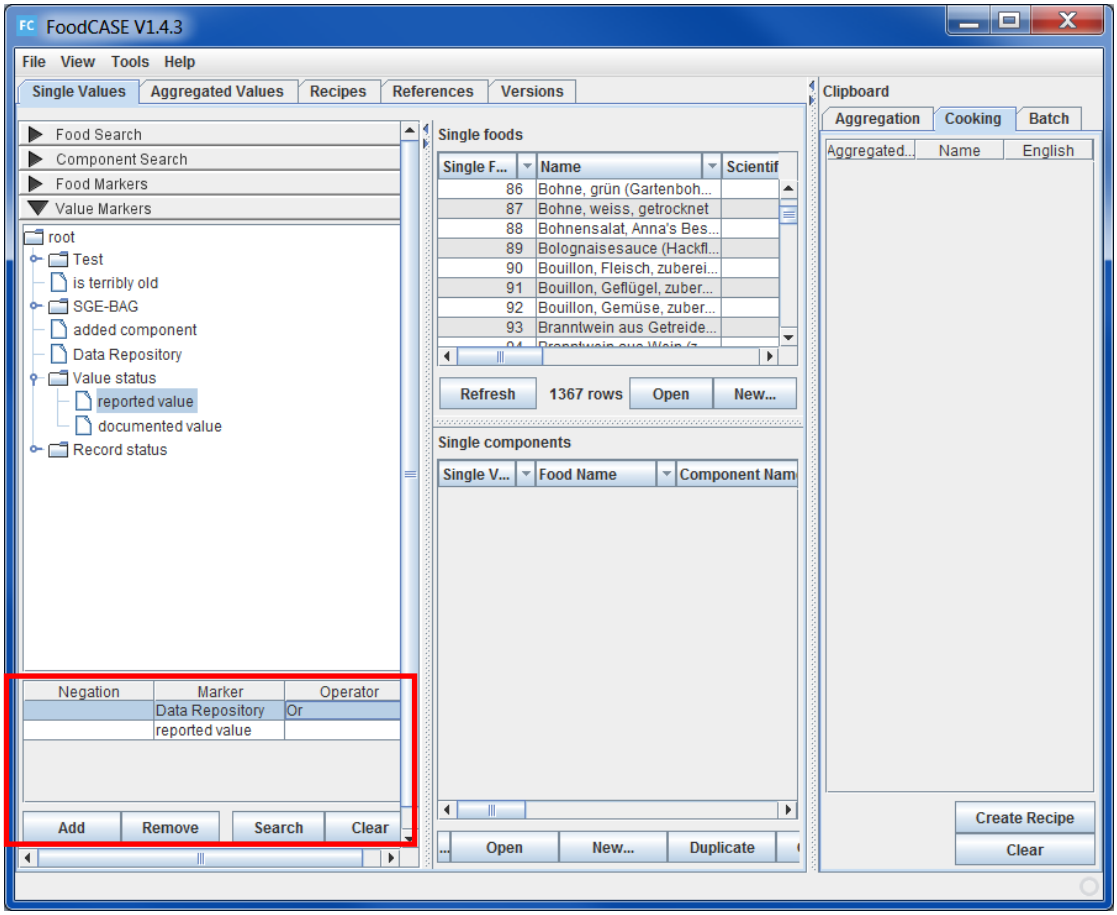


Figure 4.3.1-3: Example of selected terms and an operator in Query Build window

4.3.2 Assigning Markers to Record

Markers can be assigned to record after they have been defined in the Administration Tool.

Procedure

1. Go to the one of Single, Aggregated Values or Recipes registers
2. Select the record (food or value) to which you want assign marker
3. Click the **Open** button to open selected record
4. Click the Markers bookmark
5. In the window *Existing markers* set cursor on marker that you want to assign to record and click the **Selection arrow** button to move marker into the window *Markers of this food* (Figure 4.3.2)
6. Click the **Save** (or **Save and Close**) button to save the information

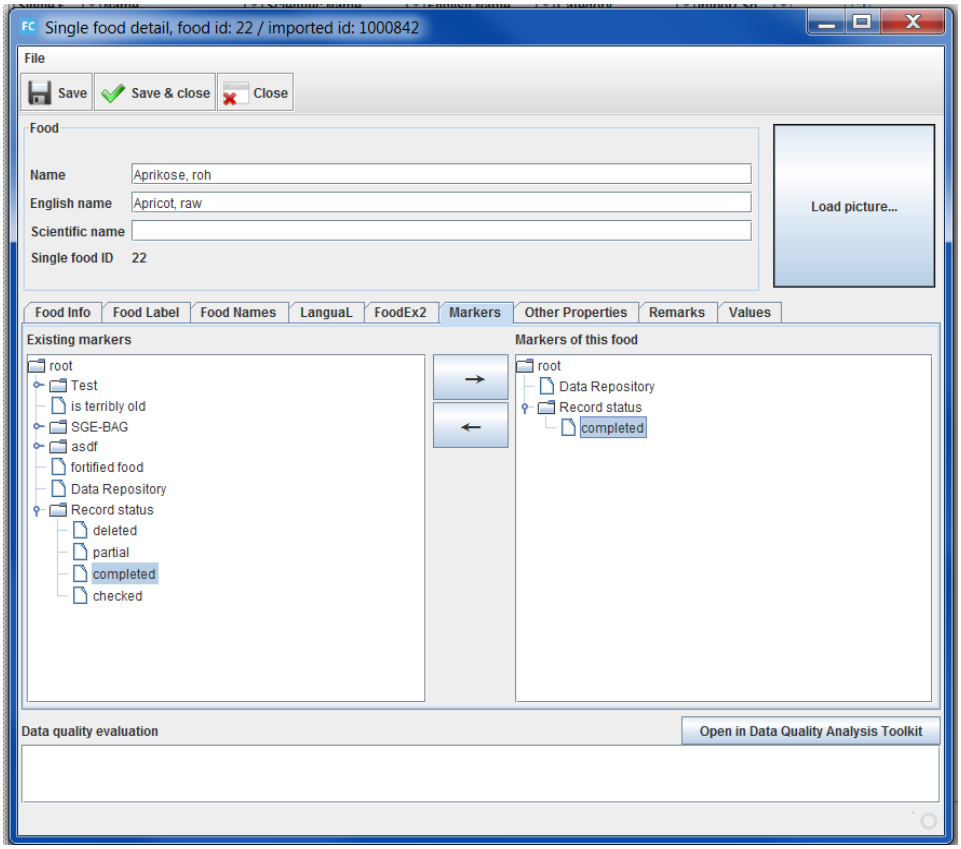


Figure 4.3.2: Markers assigned to a single food

4.3.3 Defining Markers

Markers can be defined in the Administration Tool. The Administration Tool is accessible only for users with special rights (see *User Manual for Administration Tool of FoodCASE*).

4.4 Control Measures

Control measures ensure database consistency and data distinction. Following control measures are applied in FoodCASE: check on mandatory information, data formats, significant figures, check on use of descriptors from standard thesauri and uniqueness of food names.

4.4.1 Mandatory Information

Some information is considered mandatory to keep database structure coherent. Mandatory information is indicated in the database as red coloured fields.
When leaving detail view of record the application checks its completeness. Missing mandatory information is notified in Data Quality Evaluation window at the bottom of the view. Record cannot be saved unless mandatory information is completed.

4.4.2 Data Format

Each record may have assigned rules for its format. Meeting the rules is checked whenever the field is completed and abandoned. Without filling out a correct format user can not leave the field. Required format is described in the Error message window.

Number, Decimal Number

Some fields can store only numbers, i.e. text strings are not allowed. Decimal dot must be used instead of comma.

Date

For recording date, a special format may be required. It either can consist of year only in reduced form CCYY or extended with month and day in form CCYY-MM-DD. Leading zeros are required when typing in day or month as a single figure.

4.4.3 Significant Figures

Data are entered in the Single Value register as reported to represent the original source as accurate as possible. If necessary, FoodCASE rounds the reported values to the significant figures recommended by Greenfield and Southgate (2003) when aggregating data. Thus, published data are always displayed with the recommended significant figures.
The significant figures for the components implemented in FoodCASE can be viewed, but not edited in the Administration Tool Module/EuroFIR Thesauri/Components register. Significant figures can only be modified or added to a component in the source code.

4.4.4 Link to Standard or Index

Some information describing compositional value and food in the database must be standardized**. There are standardized thesauri and own coding systems used.** Standardised terminology is maintained as controlled language vocabularies listing the agreed or standardised terms (e.g. thesauri Value Type, Method Type and Unit). The terminology is important for data interchange and common comprehension of data properties.
User selects standard term (descriptor) from a predefined drop-down list and thus FoodCASE prevents using improper terminology for data documentation. The same rule is applied for selection of a record from index (e.g. existing list of foods or references) to make documentation consistent.
Own coding system, usually national standard, can be created through Administration Tool and applied in FoodCASE as a local-specific standard. The Administration Tool is accessible only for users with special rights (see *User Manual for Administration Tool of FoodCASE*).

4.4.5 Uniqueness of Names

Food, recipe and reference name must be unique. As soon as a food is deleted from the database the food name cannot be used again.

To be completed…

5 Main Application

5.1 Main Screen

The main screen consists of three sections (Figure 5.1-1):

- Menu
- Main Registers
- Clipboard

The main screen is modifiable. One can hide some sections and/or move sections edges and change their size (Figure 5.1-1 and 5.1-2).

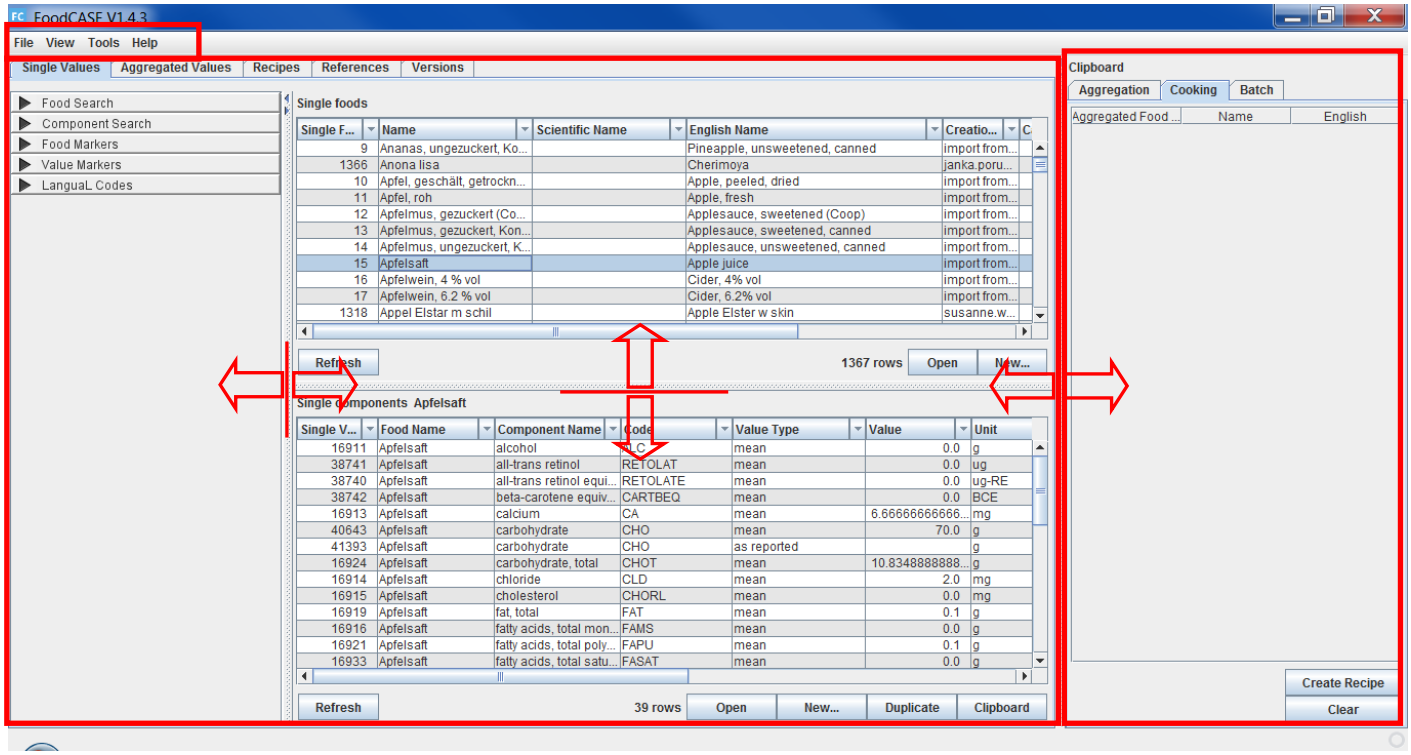


Figure 5.1-1: Dragging edges changes window size

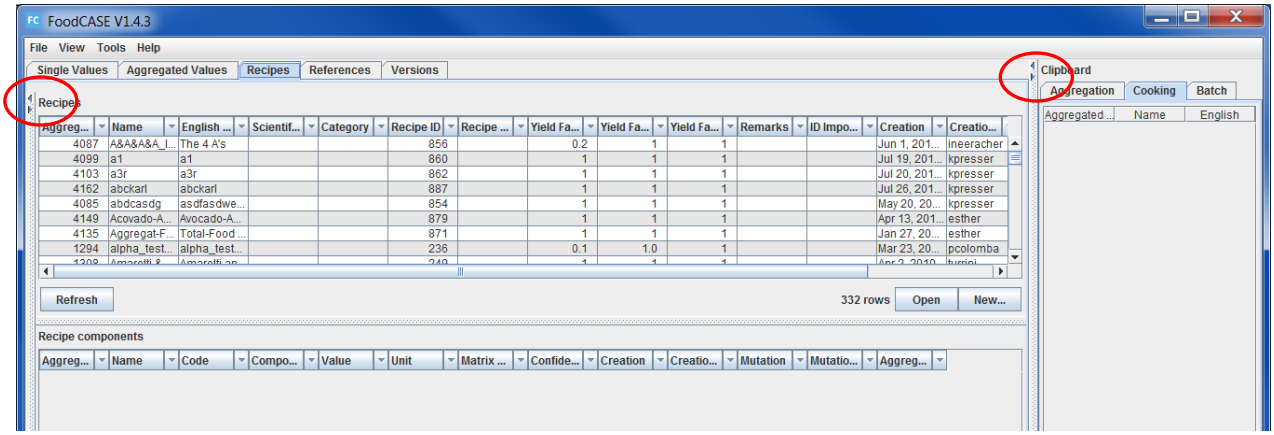
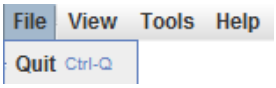


Figure 5.1-2: Arrow buttons (horizontal) hide and open Searching and Clipboard sections

5.2 Menu Bar

5.2.1 Menu File



Quit (Ctrl+Q)

Click the *Menu File → Quit (Ctrl+Q)* or use of the **Ctrl+Q** keys closes the application.

5.2.2 Menu View

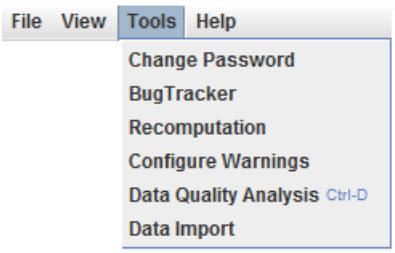
Look&Feel

Menu View → Look&Feel provides options to customize the design of the main application (e.g. colour, font, writing style, etc.). There are six different designs available.

Reset Tables

Click the *Menu View → Reset Tables* arranges columns in all tables according to default settings.

5.2.3 Menu Tools



Change Password

Click the *Menu Tools → Change Password* displays the Change password window. This window provides option to change an existing user password. A new password has to be retyped for confirmation (Figure 5.2.3.-1 and 5.2.3.-2).

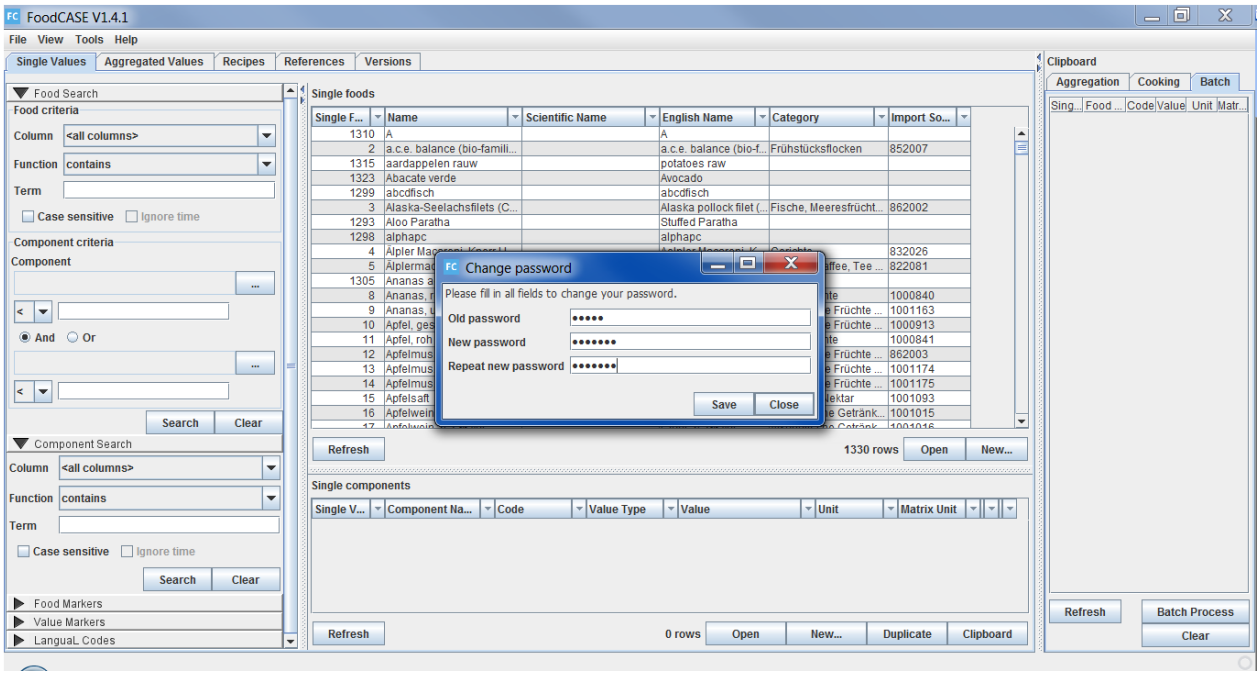


Figure 5.2.3.-1

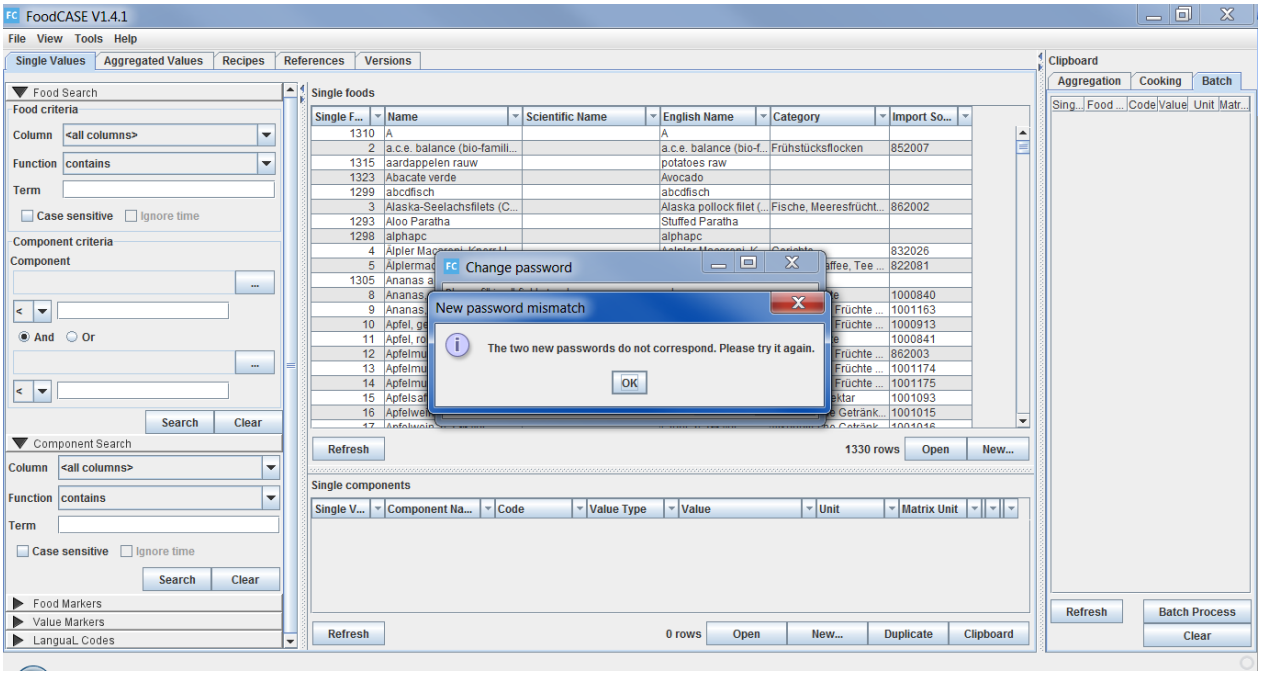


Figure 5.2.3-2: An error message emerges if new password is wrongly retyped.

BugTracker

Click the *Menu Tools → BugTracker* activates a special web application in which compilers can report bugs (i.e. system errors) on which they ran up against during their work with FoodCASE. The application is accessible for registered users.

Recomputation

Click the *Menu Tools → Recomputation* recalculates at once composition of aggregated foods and recipes that have been marked for recomputation, and in the meanwhile, a change on data was made (Figure 5.2.3-3).

Moreover, recalculation is applied on food even when given food is not marked for recomputation, whenever one changes something that has an influence on this food (e.g. change of single value that is part of an aggregated food; change of an aggregated food that is an ingredient in a recipe).

This functionality saves manual work and time. It is not automatic operation, but user must activate it manually through Menu Bar. Recomputation may take some time due to the cumulating of data.

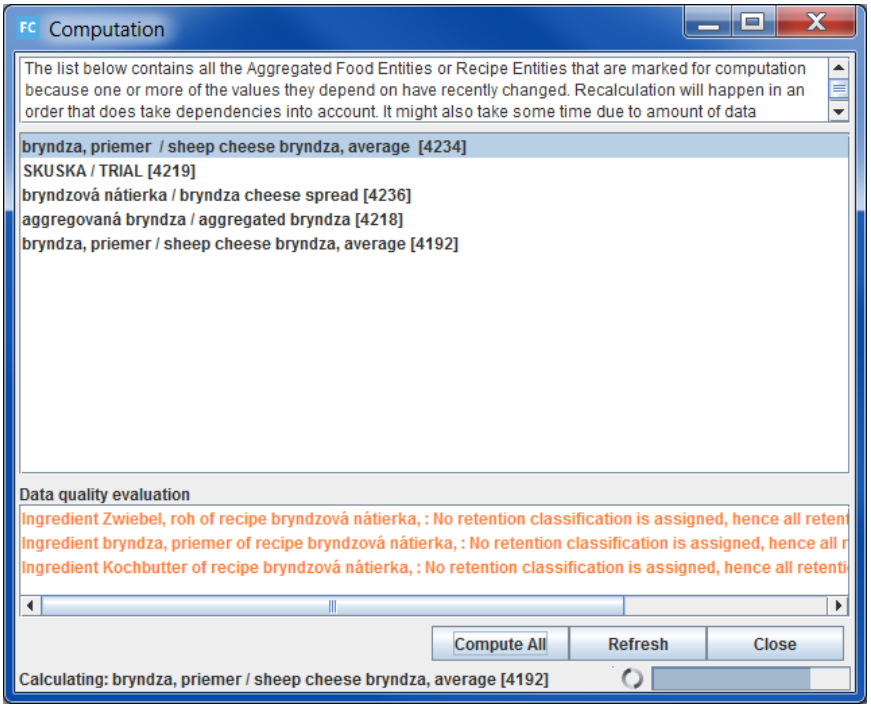


Figure 5.2.3-3: Recomputation is activated by the **Compute All** button.
At the feet of the window name of food that is just recomputed is indicated.

Configure Warnings

To maintain particular database quality and representativeness one can set extra requirements in order the database fits for a purpose. The function Configure Warnings has been created for monitoring extra requirements. Actually, there exists a fixed list of warnings in FoodCASE, version 1.4.4.

Click the *Menu Tools → Configure Warnings* opens a window in which one can enable or disable existing warning texts (Figure 5.2.3-4). The warnings that are configured as enabled will emerge during data aggregation, if the conditions are not met in contributing records (Figure 5.2.3-5). Setting of warnings affects only current user of the software.

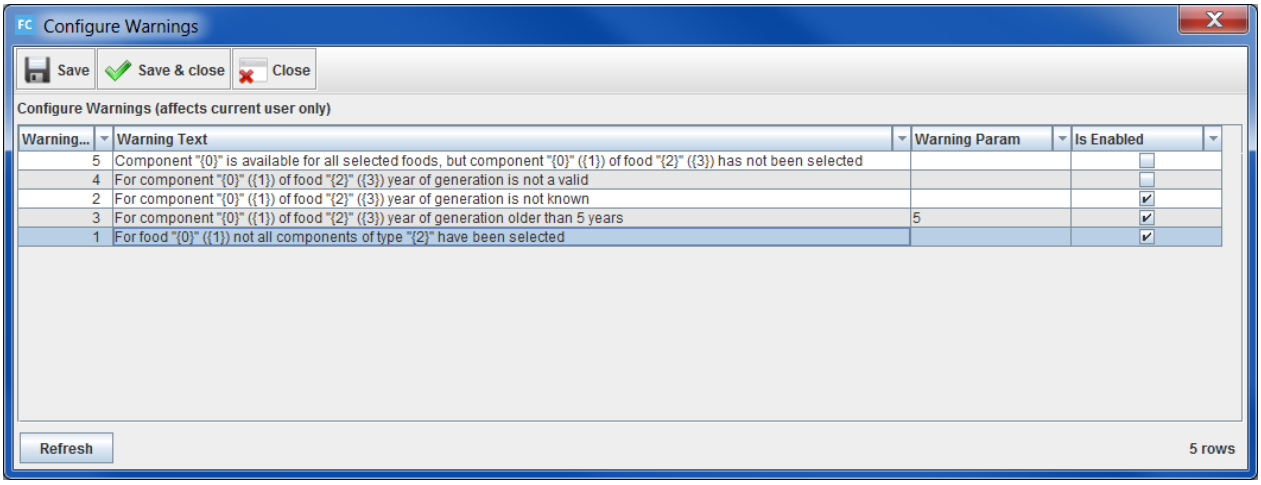


Figure 5.2.3-4: To activate warning make a tick in the column "*Is Enabled*".

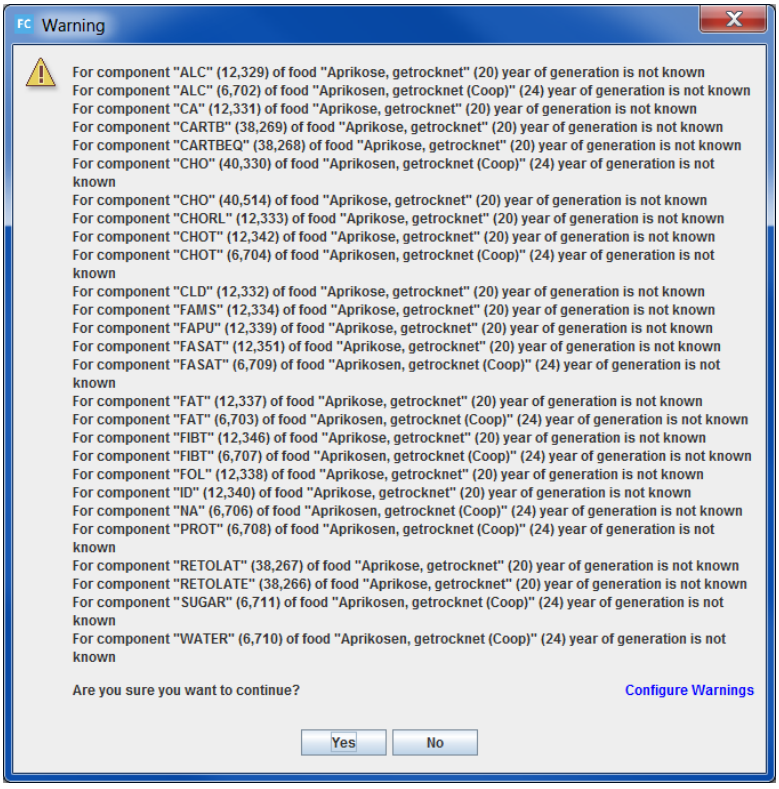


Figure 5.2.3-5: Warning window indicating missing information is displayed before aggregation

Data Quality Analysis (Ctrl+D)

The *Menu Tools → Data Quality Analysis* or use of the **Ctrl+D** keys starts an extra FoodCASE module "Data Quality Analysis Toolkit" (Figure 5.2.3-6) in which user can analyze results of the data assessment. Data quality assessment is managed and activated in the Administration Tool and can be conducted only by a user with special rights (see *User Manual for Administration Tool of FoodCASE*).

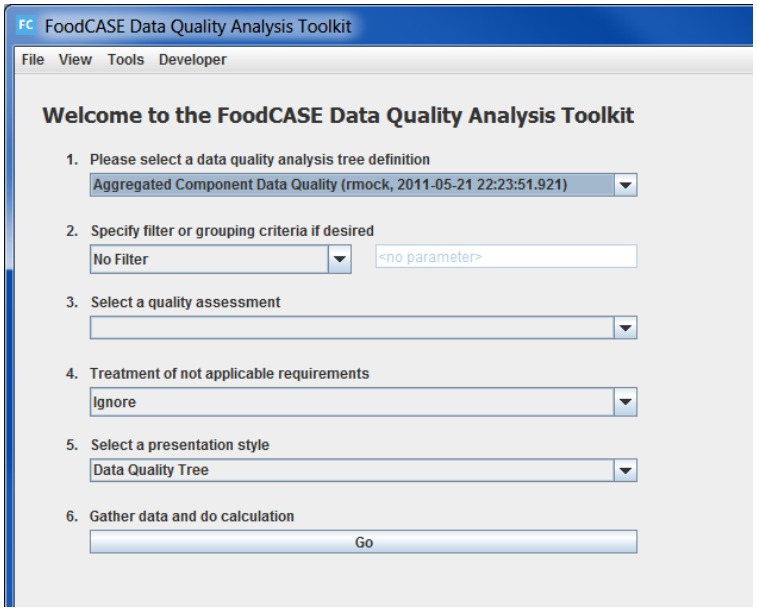


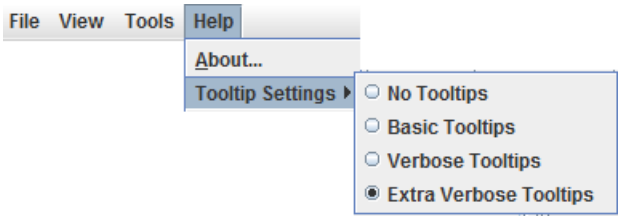
Figure 5.2.3-6

Data Import

Menu Tools → Data Import should be used for automatic import of data package in XML format into FoodCASE. The data import feature is not working yet.

5.2.4 Menu Help

Menu Help provides information about the application and tooltip settings.



About…

It is an information window about version of the application, copyright and owner (Figure 5.2.4-1).

Figure 5.2.4-1

Tooltip Settings

Tooltips guide user during work with the application. User positions the cursor over an item, without clicking it, and a tooltip may appear. There are no tooltips for all items in FoodCASE, yet. In the *Menu Help → Tooltip Settings* user can completely turn off tooltips (No Tooltips option) or turn on tooltips with graded volume of instructions (Basic Tooltips, Verbose Tooltips, Extra Verbose Tooltips) (Figure 5.2.4-2).

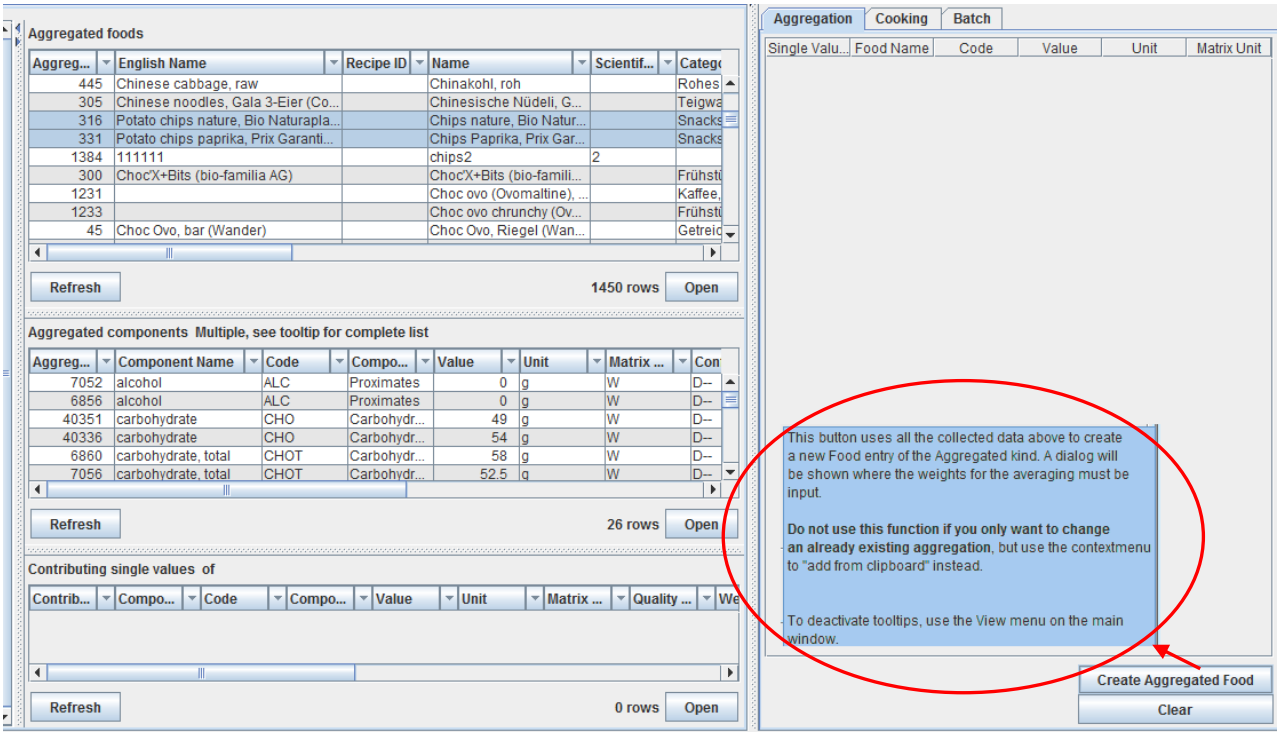


Figure 5.2.4-2: Example of Extra Verbose Tooltip

5.3 Main Registers

FoodCASE contains five main registers:

- Single Values
- Aggregated Values
- Recipes
- References
- Versions

One of the main roles of the registers is to overview and to give an access to data – foods, values, references and other meta information.
There are several query dialogs located in the search area that are specific to each register. Query dialogs provide searching options at different information levels (e.g. search for food name or search for particular component value).

5.3.1 Single Values

Single values correspond to EuroFIR definition of Level 2. Initial Database (Level 2: Archival data and Level 3: reference database by Greenfield and Southgate, 2003). The register is applied for management of food compositional information as reported in the original document. Data should be expressed as they were reported first and then converted into the standard units (note: the information is missing on how to store reported value and then converted value). Information should be translated into standard coding and naming schemes. Relevant transformations are computed/calculated during the aggregation process.

5.3.2 Aggregated Values

The register is used for management of aggregated food compositional information. Aggregated values in the Aggregated Values register are computed by FoodCASE from data available in the Single Values register.

Additionally, recipes calculated by FoodCASE in the Recipe register are also considered as aggregated foods as the ingredients are taken from the Aggregated Values register. Recipes are present both in the Aggregated Values and Recipe registers.

5.3.3 Recipes

The register enables management of foods computed by FoodCASE according to a recipe. Calculation of recipe generally concerns to ready-to-eat dishes primarily prepared at homes or at restaurants. However, some recipe calculations are applied to food products like bread or canned foods.

For recipe calculation, one selects foods from the Aggregated Values register and defines their amounts and culinary treatments.

List of ingredients taken from food label or published by food producer is documented somewhere else and has nothing in common with the recipe calculation. Common recipe sources are cookbooks.

5.3.4 References

The register is applied for management of all types of references, i.e. references to value sources, methods, recipes, etc.

5.3.5 Versions

It is a display (and quick overview) of archived database versions. New database versions are created in the Administration Tool. The Administration Tool is accessible only for users with special rights (see *User Manual for Administration Tool of FoodCASE*).

5.4 Clipboard

The Clipboard is a functionality that is used for temporary storage of data.
There are three bookmarks within the Clipboard: Aggregation, Cooking and Batch.

5.4.1 Clipboard vs. Single Values Register

A single component value as well as a complete pool of single component values for one or more single foods can be stored in the Clipboard – Aggregation bookmark and Clipboard – Batch bookmark.
The main role of the Clipboard - Aggregation window is a short-term storage of single values to be aggregated.
The main role of the Clipboard – Batch window is a short-term storage of single values to which one wants add identical information.

Sending single values to the Clipboard

1. Go to the Single Value register
2. Select the food in the upper (Single foods) panel of the central working area which you want store in the Clipboard
3. Click on a single component value of the selected food in the lower (Single components) panel of the central working area and drag cursor over several values (or press and keep **Ctrl** key and click on individual rows or press **Ctrl+A** keys to select all rows)
4. Click the **Clipboard** button
5. Selected components are copied into the Clipboard – Aggregation and Clipboard – Batch (Figure 5.4.1-1 and 5.4.1-2)
6. Repeat the procedure to copy single values of further foods into the Clipboard
7. Click the **Clear** button or quit the application to empty the Clipboard (the **Clear** button clears all items from the Clipboard)

Note: For aggregation procedure using the Clipboard see chap. 6.2.5 Aggregating New Food and for batch processing see chap. 6.9 Batch Processing.

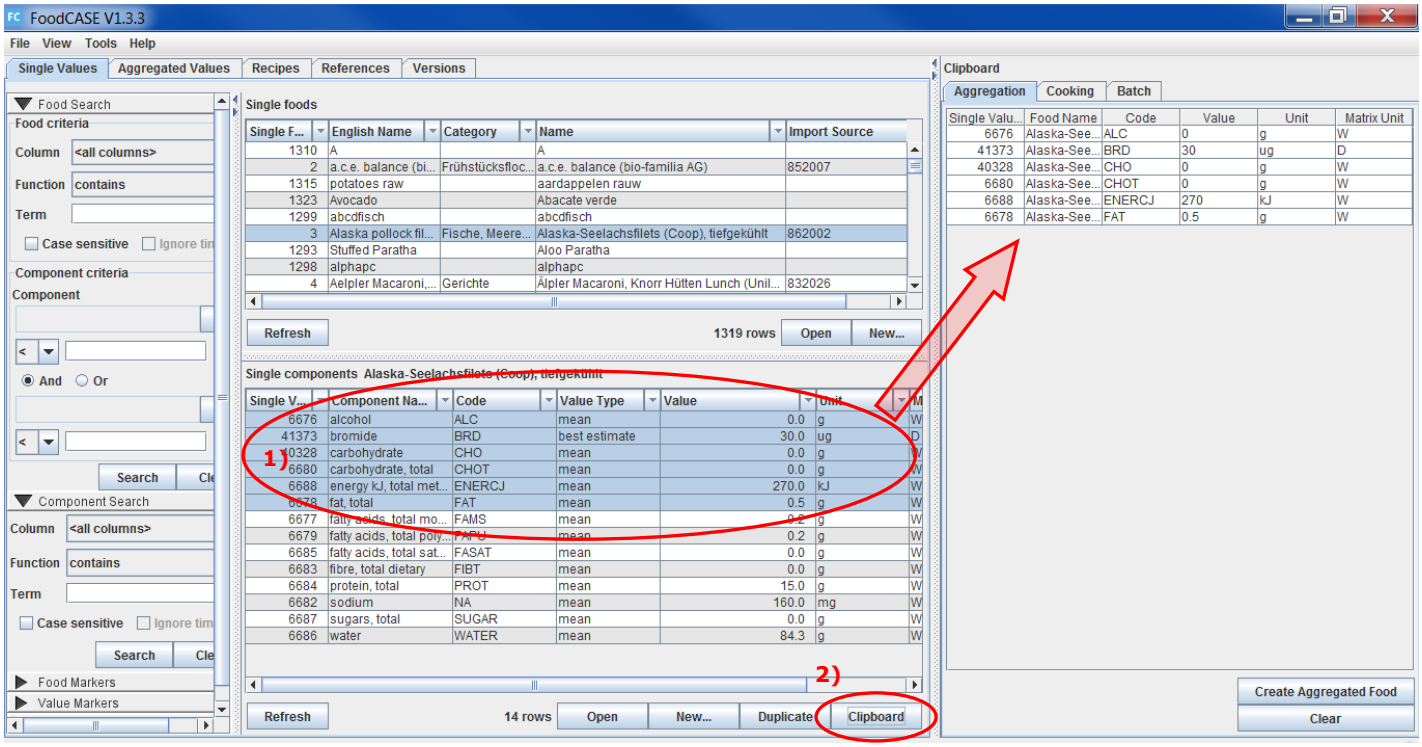


Figure 5.4.1-1: Storage of several single component values (for fish) in the Clipboard

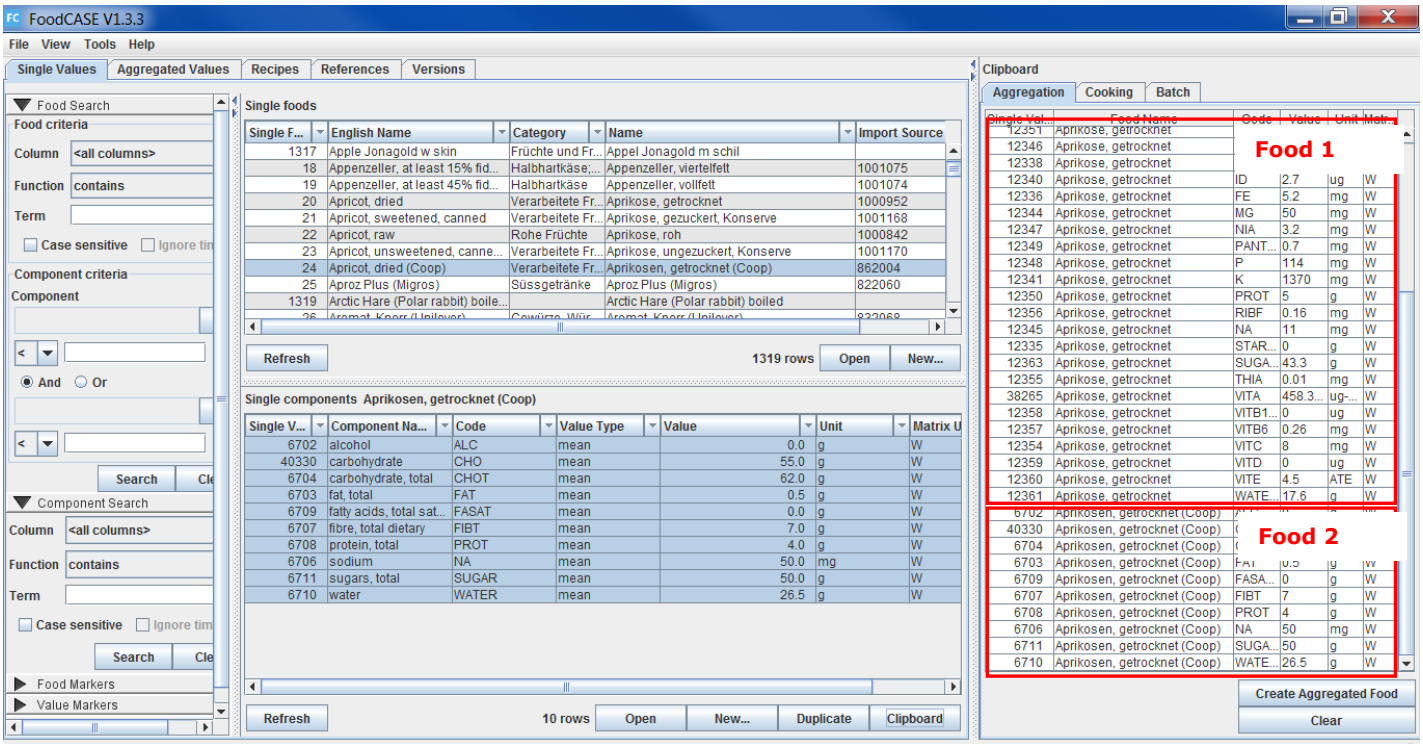


Figure 5.4.1-2: Storage of complete set of component values available for two single foods (dried apricots) in the Clipboard

5.4.2 Clipboard vs. Aggregated Values Register

An aggregated food or more aggregated foods (including complete pool of aggregated values) can be stored in the Clipboard – Cooking.
The main role of the Clipboard – Cooking is short-term storage of aggregated foods and recipes to be used for recipe calculation.

Sending aggregated food(s) to the Clipboard

1. Go to the Aggregated Values register
2. Select the food in the upper (Aggregated foods) panel of the central working area which you want store in the Clipboard
3. Right click on the food and choose the **Send to Clipboard** option (or press and keep **Ctrl** key and click on individual rows or press **Ctrl+A** keys to select all rows and right click)
4. Selected food is copied into the Clipboard – Cooking
5. Repeat the procedure to copy further aggregated foods into the Clipboard
6. Click the **Clear** button or quit the application to empty the Clipboard (the **Clear** button clears all items from the Clipboard)

Note: For recipe calculation procedure using the Clipboard see chap. 6.3.6 Creating Recipe Using the Clipboard.

5.4.3 Clipboard vs. Recipes Register

A recipe or more recipes (including complete pool of calculated component values) can be stored in the Clipboard – Cooking.
The main role of the Clipboard – Cooking is short-term storage of aggregated foods and recipes to be used for recipe calculation.

Sending recipe(s) to the Clipboard

1. Go to the Recipes register
2. Select the food in the upper (Recipes) panel of the central working area which you want store in the Clipboard (only single selection is possible)
3. Right click on the food and choose the **Send to Clipboard** option
4. Selected recipe is copied into the Clipboard – Cooking
5. Repeat the procedure to copy further recipes into the Clipboard
6. Click the **Clear** button or quit the application to empty the Clipboard (the **Clear** button clears all items from the Clipboard)

Note: For recipe calculation procedure using the Clipboard see chap. 6.3.6 Creating Recipe Using the Clipboard.

6 Compiling food composition data

6.1 Management of Single Values – Initial Database

Initial database is created in the Single Values register (Figure 6.1).

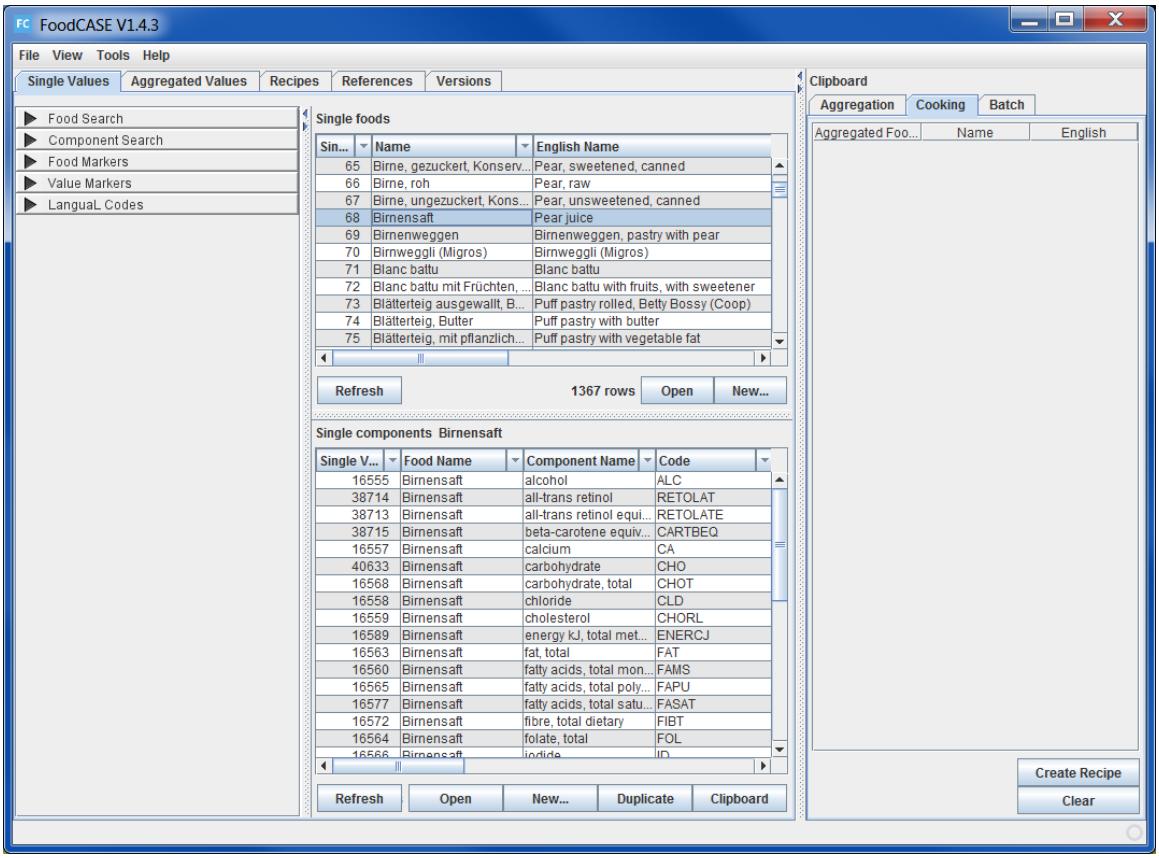


Figure 6.1

6.1.1 Adding New Food

In general, new foods are added in the Single Values register (with the exception of recipes that are calculated within FoodCASE). This is valid for adding food manually.

Entering new food

1. Go to the Single Values register (Figure 6.1)
2. Click the **New...** button in the upper (Single foods) panel of the central working area
3. Complete at least mandatory information (red fields) in the open Single food detail window (Figure 6.1.1)
4. Click the **Save** (or **Save and Close**) button to save the information

Note: If the new food name is not unique, information will not save.

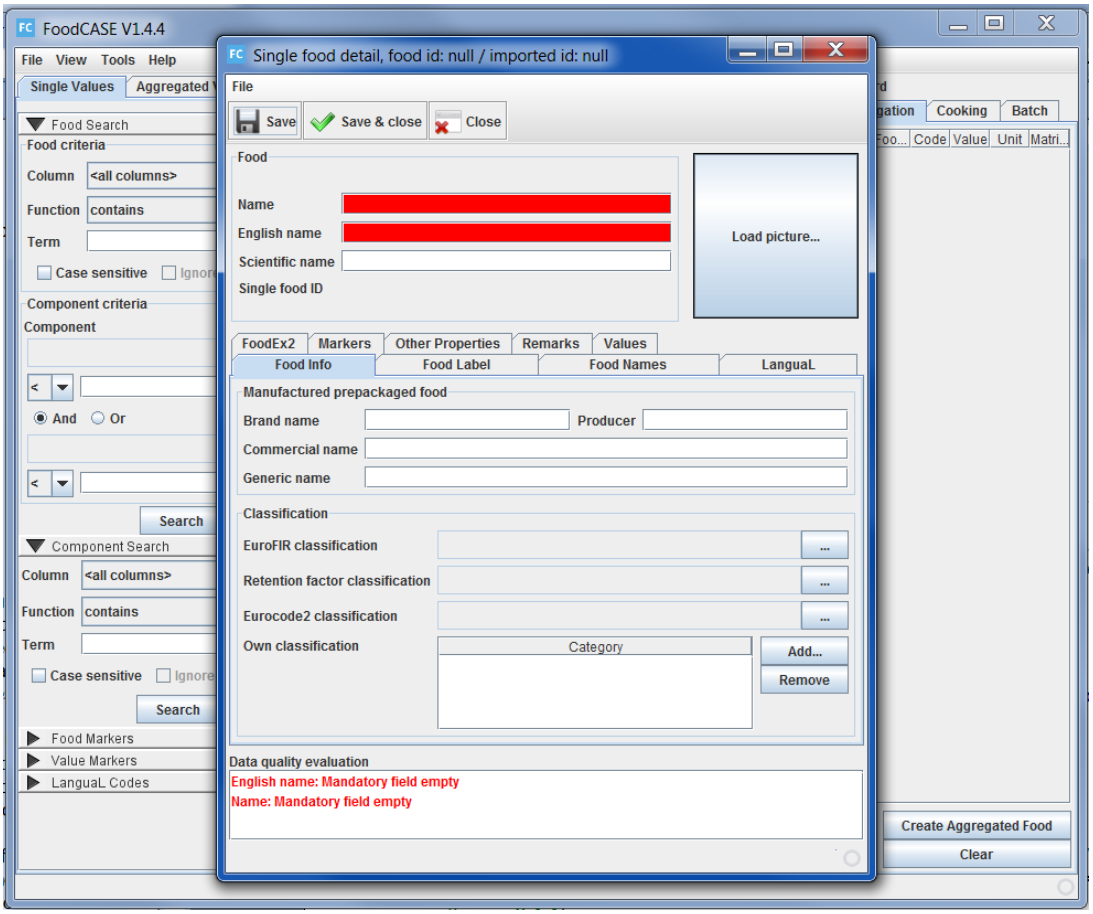


Figure 6.1.1: For saving new single food only original and English food names are mandatory

6.1.2 Adding Picture to Single Food

Only ".jpg", ".gif" and ".png" file name extensions are allowed for pictures that are saved for foods. FoodCASE users must be aware of not using pictures that are protected by copyrights. For single foods, it is recommended, if possible, to use the real photos of foods that were analysed. Procedure for uploading picture is applicable for foods in all database levels.

Uploading picture

1. Go to the Single Values register (or Aggregated Values and Recipe registers)
2. Select the food for which you want add a picture
3. Double click on the food row or click the **Open** button to open Single food detail window
4. Click the **Load picture…** button or click the *Menu File → Add or change picture* (Figure 6.1.2-1)
5. Find picture in the Open dialog box
6. Select the desired picture and click the **Open** button (or use double click on the file) to load the picture (Figure 6.1.2-2)

Note: For removing picture completely… *To be completed…*

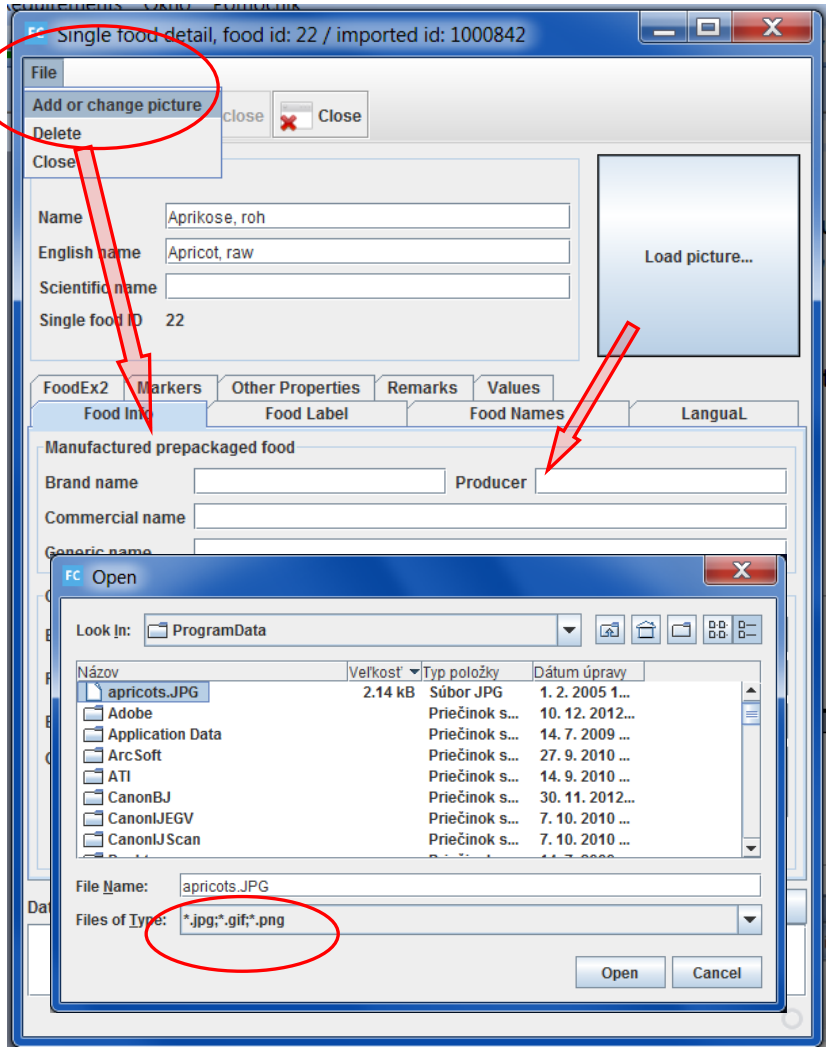


Figure 6.1.2-1: Allowed filename extensions are displayed in the “Files of Type” field

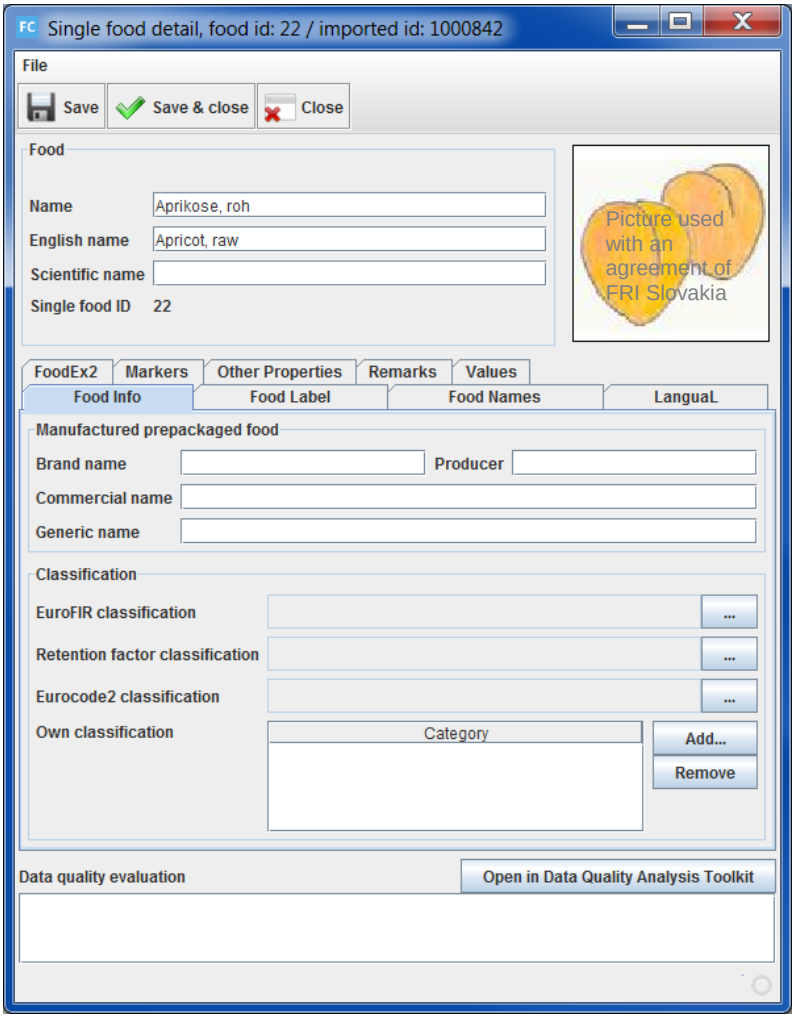


Figure 6.1.2-2

6.1.3 Indexing Single Food with LanguaL Code

To be completed …

6.1.4 Adding New Single Component Value

New values from original sources are entered in the Single Values register. One can either create a new single value by directly entering all new information or by duplicating an existing single value and modify the necessary information.

Entering new single component value

1. Go to the Single Values register
2. Click the **New...** button in the lower (Single components) panel of the central working area
3. Select the food for which you want enter a single value (the pre-selected food is the one that is selected in the upper (Single foods) panel) (Figure 6.1.4-1)
4. Select the component for which you want to enter the information

5. Alternatively, copy the component from the food which is selected in the upper (Single foods) panel. In this case, it is better to select the food from which you want copy the component value before activation of the **New**… button (Figure 6.1.4-2)
6. Click the **OK** button
7. Complete at least mandatory information (red fields) in the opened Single value detail window
8. For component copied from another food, check the copied information
9. Click the **Save** (or **Save and Close**) button to save the information

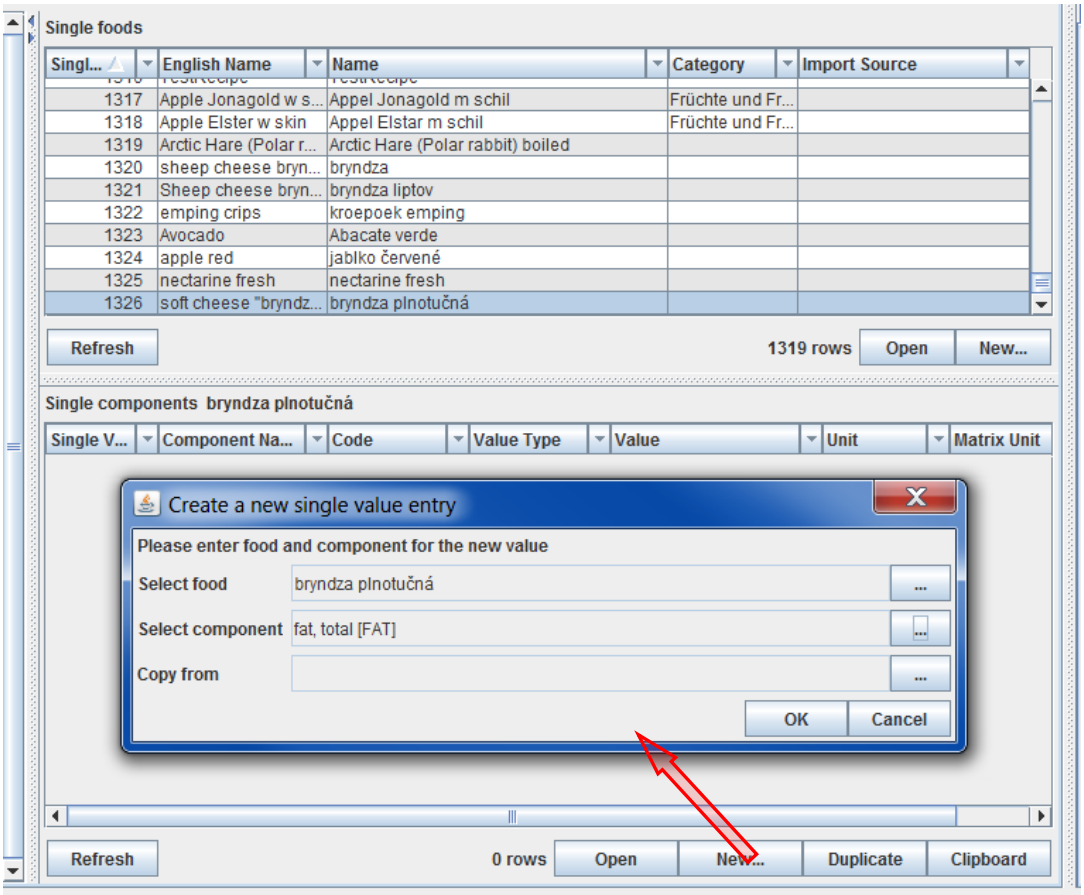


Figure 6.1.4-1: Search for food is in original language

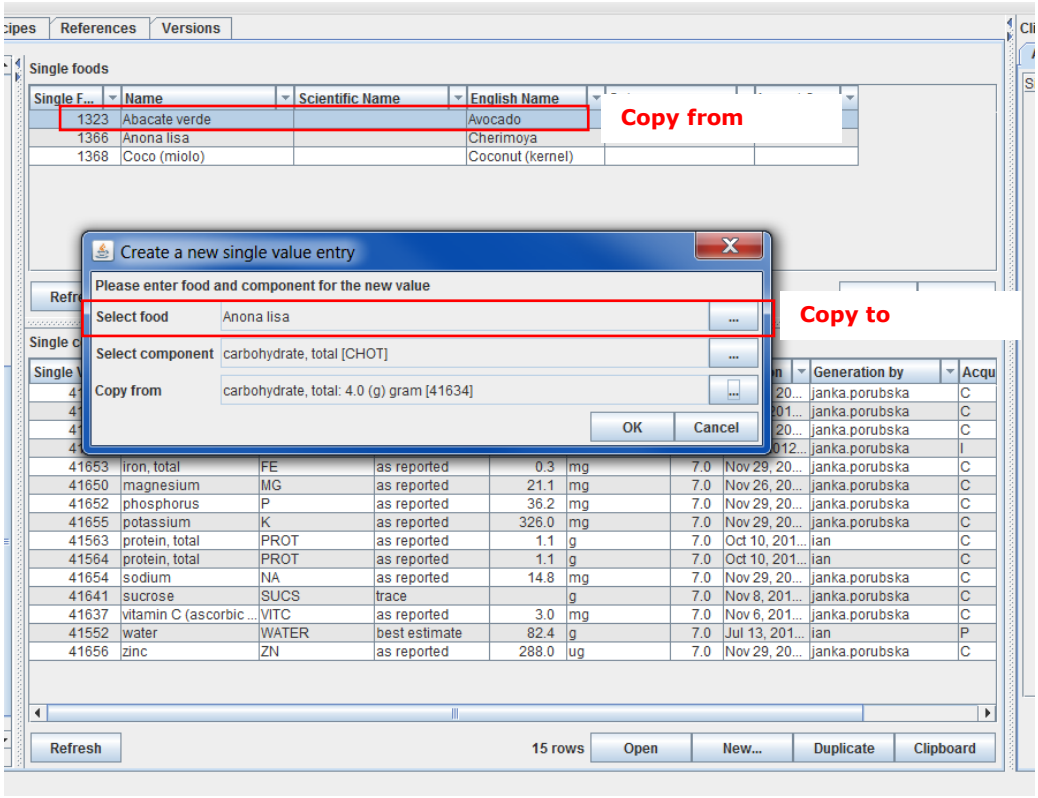


Figure 6.1.4-2: Carbohydrate, total copied from avocado to cherimoya

6.1.5 Duplicating Single Component Value

One single data source may contain information about several components or foods that were generated with identical or very similar methods. Using the duplication feature of FoodCASE one can quickly "copy and paste" already compiled information into the same or new food and then alter those pieces of information that are not identical.

Duplication of information is possible only in the Single Values register.

Duplicating procedure

The information of component can be duplicated into the same or into another food.

1. Go to the Single Values register
2. Select the component from which you want to copy the information by single clicking on it
3. Click the **Duplicate** button
4. Select the food you want to copy the information into (change the default, which is the food from which you copy the information, if you want to copy the information into another food, e.g. from chicken breast into chicken leg)
5. Select the component you want to copy the information into (default is the food from which you copy the information)
6. Select the specific component/value information you want to copy the information from (default is the component you have selected, but you still can change it at this level)
7. Click the **OK** button

8. Check or change the information for duplicated component value in the opened Single value detail window
9. Click the **Save** (or **Save and Close**) button to save the information

6.1.6 Duplicating Entire Single Food

The duplication of an entire food (with all component values) is not possible.

6.1.7 Updating Single Food Information

All food properties can be modified including food name.

Updating procedure

1. Go to the Single Values register
2. Double click on food you want modify or click the **Open** button in the upper (Single foods) panel of the central working area
3. Change required information of food in the open Single food detail window
4. Click the **Save** (or **Save and Close**) button to save the information

6.1.8 Updating Single Component Value Information

All information (e.g. reference, quality index, method, etc.) including value itself can be modified except food name.

Updating procedure

1. Go to the Single Values register
2. Select the food in which you want update a single value
3. Double click on value you want modify or click the **Open** button in the lower (Single components) panel of the central working area
4. Change required information of value in the open Single value detail window
5. Click the **Save** (or **Save and Close**) button to save the information

6.1.9 Deleting Single Value/Food

Deletion of single value or single food is possible. If single food is deleted, then all related values are deleted as well.
For more details and procedure see chapter *4.2.7 Deleting Record*.

6.2 Management of Aggregated Values

Aggregated database is created in the Aggregated Values register (Figure 6.2).

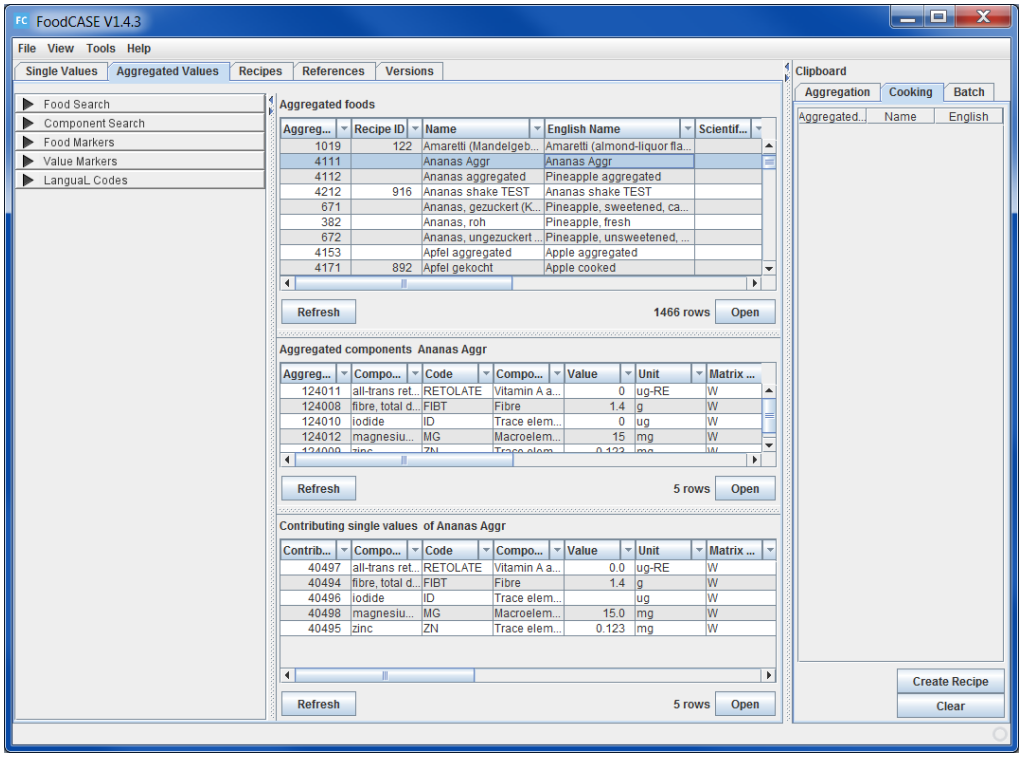


Figure 6.2

6.2.1 What is Aggregation

Aggregation is a process of creation a representative value for a certain version of the database. For single food, one or more component values may exist. If more values exist, they need to be aggregated. Then the representative component value is either weighted mean or a compiler-chosen value (best estimate, median, etc.). “Weighted” means that compiler can add to a particular value higher or lesser importance (priority) than to others. Weights depend on season, production, variability and availability of foods on market, food consumption, etc.

6.2.2 Versions

Since new data sources are continuously screened and new single values continuously added to the database, the aggregation is regular and thus different versions of the database are produced. Frequency of aggregation is varied.

FoodCASE computes aggregated values from single values. In existing aggregated food contributing values can be modified, i.e. single value updated or selection of single values can be changed. Then in two versions an aggregated food can have different composition.

6.2.3 Ways of Aggregation

Following ways of aggregation procedures are possible in FoodCASE:

- Aggregation of single values within a single food (in case one value is available for single food and thus is identical with aggregated value),
- Aggregation of more single values within a single food (in case more values for same component exist within single food),
- Aggregation of single values of more single foods.

6.2.4 Concept of Aggregation for More Single Values

The concept of aggregation is based on defining the weights and then calculating the representative value. For more single values following formula is used for aggregation in FoodCASE:

$$\textbf{aggregated value} = \sum_{i=1}^{n} \textbf{weight}_i * \textbf{single values}_i,$$

- where weight can acquire values from 0 to 1.

6.2.5 Aggregating New Food

Aggregated food can be generated by manual aggregation in the Aggregated Value register; however, large datasets of aggregated foods can be imported into the database automatically, but this feature is missing in FoodCASE in the present version. In case of automatic import, contributing foods are not available.

Aggregation procedure

1. Go to the Single Value register
2. Click on a food in the upper (Single foods) panel of the central working area which you want aggregate (to select more foods for aggregation drag cursor over more foods or press and keep **Ctrl** key and click on individual rows)
3. Click on a single component value(s) of the selected food(s) in the lower (Single components) panel of the central working area and drag cursor over other values (or press and keep **Ctrl** key and click on individual rows)
4. Click on the **Clipboard** button
5. Selected components are copied into the Clipboard
6. Repeat the procedure to copy further food(s) into the Clipboard
7. Click the **Create Aggregated Food** button
8. Click the **Yes** button if you accept warnings (or the **No** button if you do not want to continue aggregation) (Figure 6.2.5-1)
9. Complete at least the mandatory information (red fields) in the opened Specify the Aggregation Parameters detail window (Figure 6.2.5-2 – 6.2.5-5)

10. Click the **Finish** button
11. Go to the Aggregated Values register
12. Click the **Refresh** button in the upper Aggregated foods panel to upload the new aggregated food into the food list
13. Aggregated values are displayed in the middle panel and contributing values are displayed in the lower panel of the central working area
14. Alternatively, click the **Open** button to open the aggregated food and complete additional information about the aggregated food
15. Click the **Save** (or **Save and Close**) button to save the information

Note: Before starting aggregation procedure, make unification of units, round values based on defined significant digits and check availability of values in order aggregation of single values is logical and compatible.

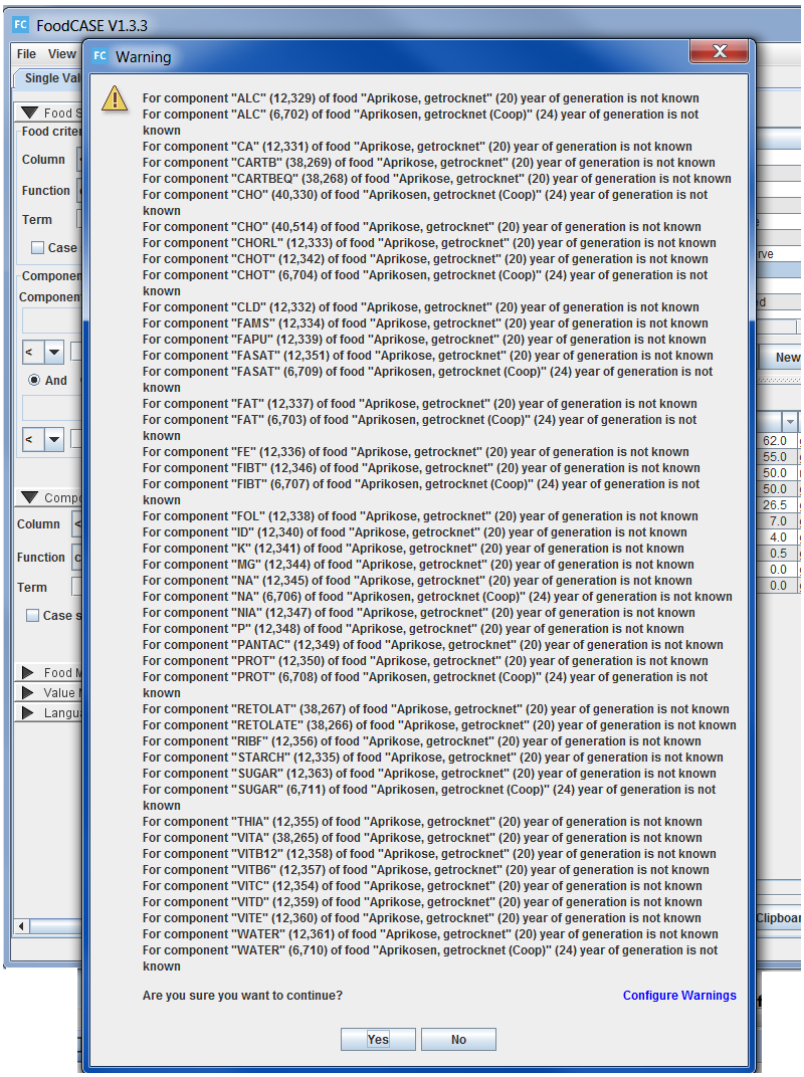


Figure 6.2.5-1

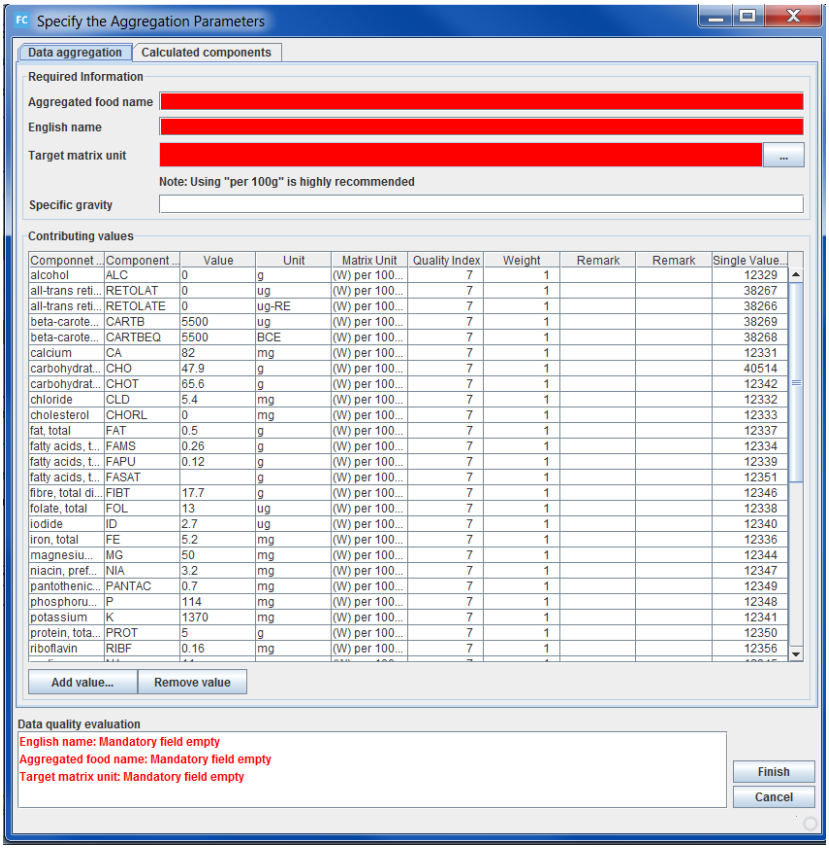


Figure 6.2.5-2

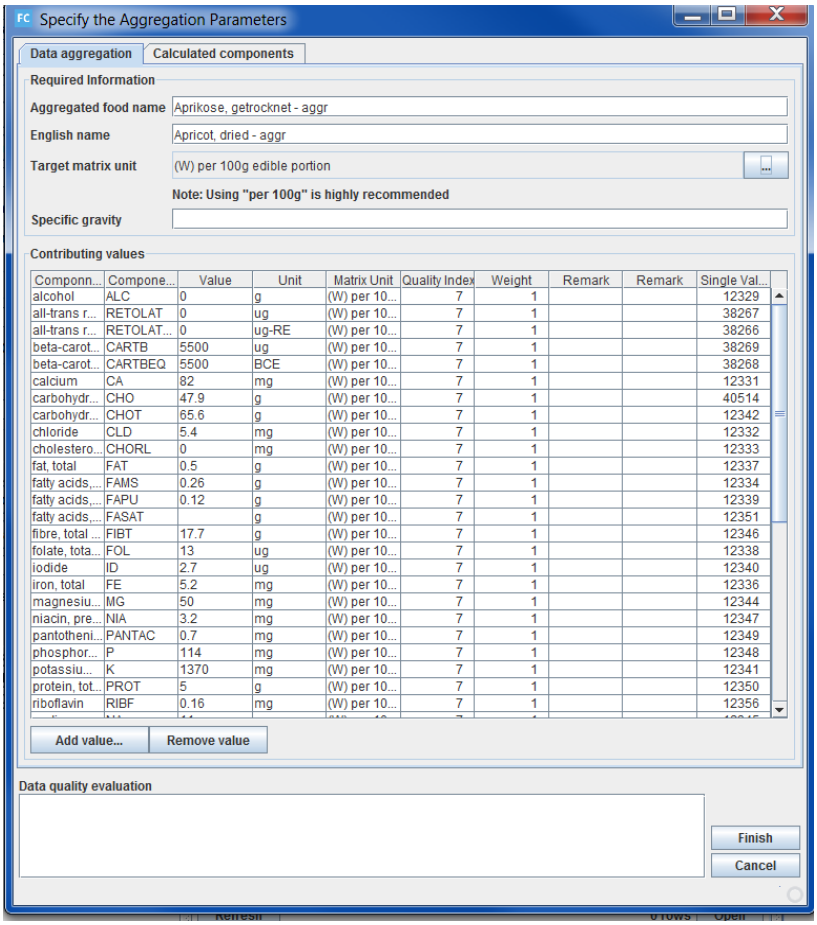


Figure 6.2.5-3

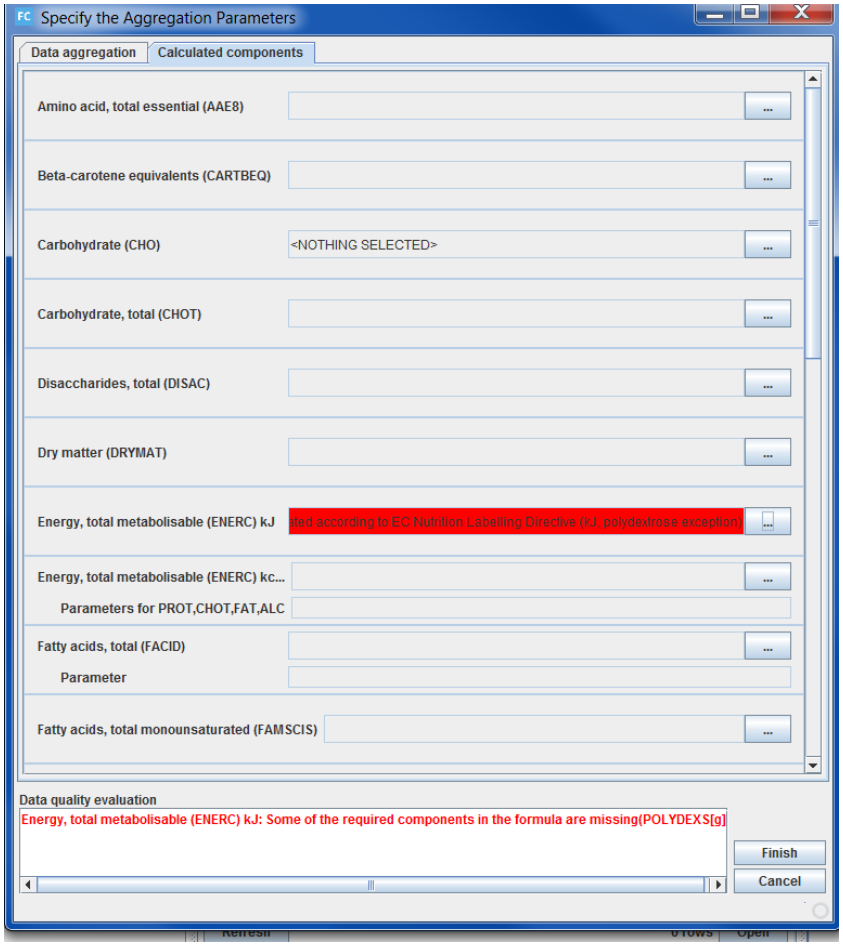


Figure 6.2.5-4: FoodCASE prevents calculations if a component in formula is missing

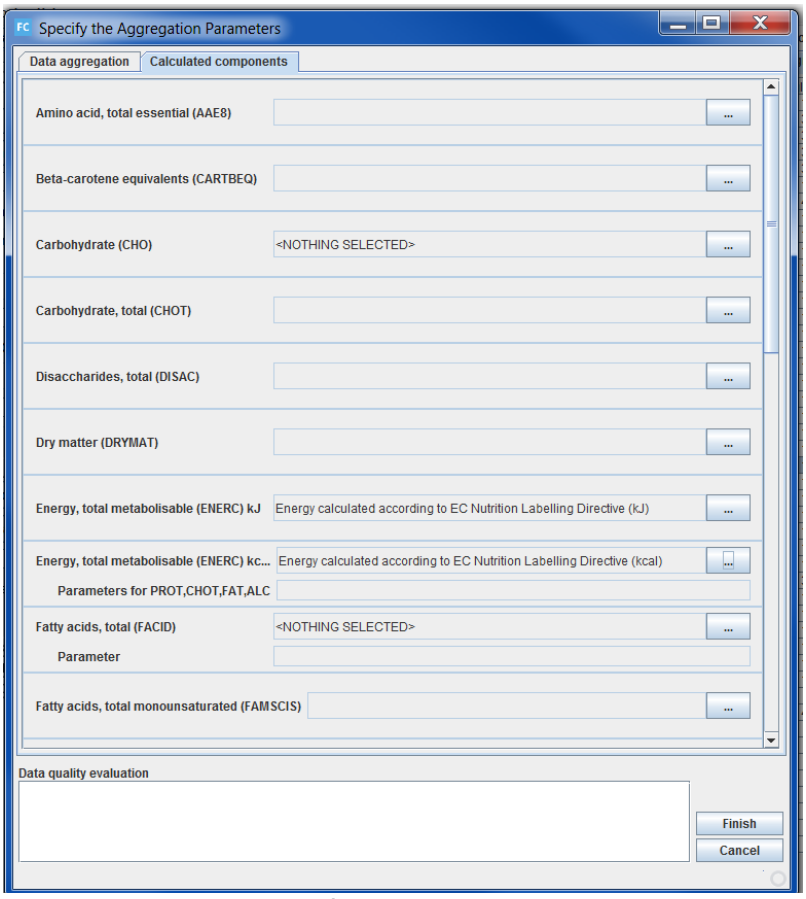


Figure 6.2.5-5

6.2.6 Adding Picture to Aggregated Food

Aggregated foods representing generic composition should be displayed like common foods with no labels and brand names on picture. Aggregated foods with more specific character should reflect the very own picture of food.

For adding a picture to an aggregated food, follow the procedure described in chap. *7.1.2 Adding Picture to Single Food* that is applicable for uploading picture for foods at all database levels.

6.2.7 Indexing Aggregated Food with LanguaL Code

To be completed…

6.2.8 Duplicating Aggregated Food/Value

The duplication of neither aggregated component value nor entire aggregated food (with all component values) is possible.

6.2.9 Recomputation of Aggregated Food and Recipes

Recomputation is applied for more aggregated foods (and recipes) at once. It is an automatic recalculation when contributing values (and ingredients) have been updated and regular actualisation is expected in future (e.g. selected value was changed and/or quality index improved with more metadata documentation).
Before a certain group of aggregated foods is recomputed, all related foods must be marked for recomputation (tick in the check box *Marked for recomputation*, Figure 6.2.9-1). However, there are situations when food even not marked for recompuation is automatically recalculated. This is a case when some information or data, which are connected somehow to particular aggregated food or recipe, were changed (e.g. ingredient in recipe was updated in a single contributing value).

Recomputation procedure

1. Go to the Aggregated Values (or Recipes) register
2. Select the aggregated food in the upper (Aggregated foods) panel of the central working area which you want include for recomputation (or the recipe in the Recipe panel)
3. Click the **Open** button to open the aggregated food (or recipe)
4. Tick the check box *Marked for recomputation* (Figure 6.2.9-1)
5. Click the **Save and Close** button to save the information
6. Repeat the procedure for further aggregated foods (or recipes)
7. Go to the *Menu Tools → Recomputation*
8. FoodCASE checks all aggregated foods (and recipes) marked for recomputation and lists those that have recently changed one or more values (Figure 6.2.9-2)
9. Click the **Compute All** button to recompute listed foods
10. Click the **Close** button to end up work in the Computation window
11. Click the **Refresh** button in the Aggregated Values (and Recipes) register to reload actual data from database

*Note: Data quality evaluation at the bottom of the Computation window indicates missing information that decreases data quality. Missing information can be completed immediately and included for recomputation by using the **Refresh** button.*

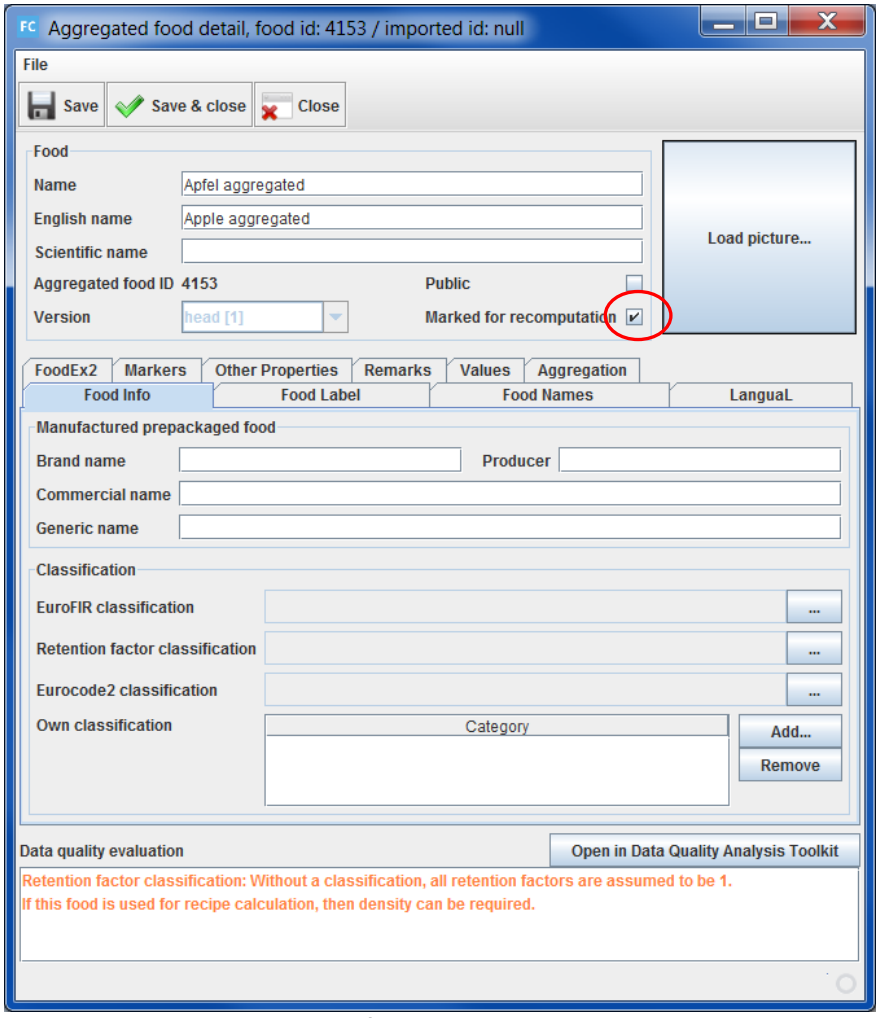


Figure 6.2.9-1

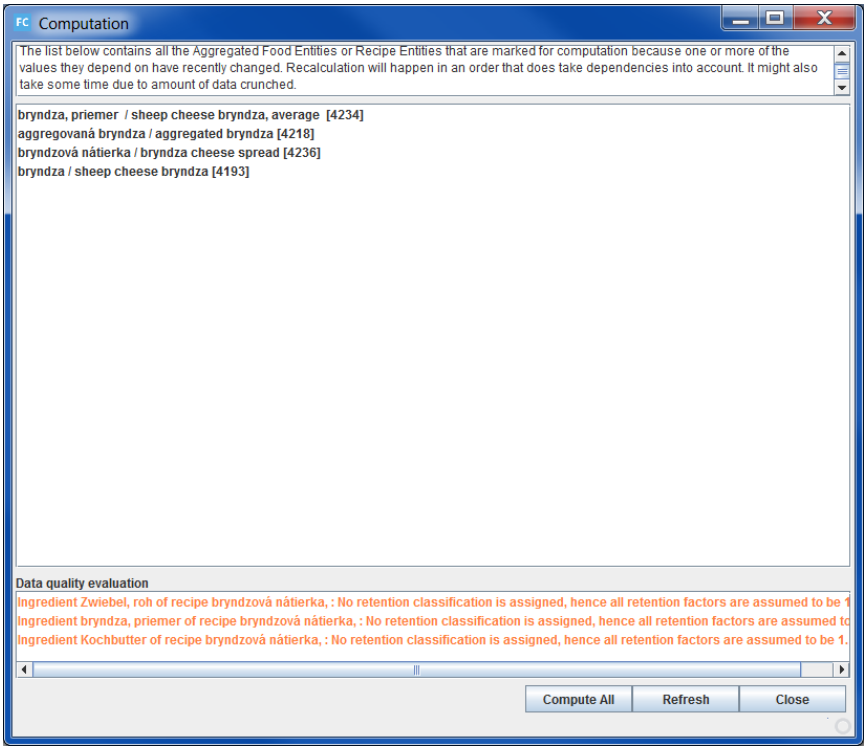


Figure 6.2.9-2

6.2.10 Modifying Aggregated Food

In case new single component value is inserted into the database, related aggregated foods should be modified and consider inclusion of new value into the aggregation. In general, modification comprises possibility of change in:

- Selection and number of contributing values,
- Matrix unit,
- Weights for contributing values,
- Selection different formula for calculated components.

Modification procedure

1. Go to the Aggregated Values register
2. Select the aggregated food which you want modify in the upper (Aggregated foods) panel of the central working area
3. Click the uppermost **Open** button to open the aggregated food
4. Click the Aggregation bookmark
5. Click the **Modify aggregation** button
6. Modify selection of contributing single values by using the **Add value…** or the **Remove value** button and/or modify other relevant information (e.g. weights, change calculation formula for calculated components or add more metadata, etc.)
7. Click the **Finish** button to recompute the aggregated food
8. Close the Aggregated food detail window (or use the **Close** button)
9. Click the **Refresh** button in the middle panel (Aggregated components) panel of the central working area to upload modified aggregated values

6.2.11 Modifying Aggregated Value

Aggregated values as such cannot be modified manually. They can be modified only within modification of the aggregated food by selecting new or removing existing contributing values and subsequent software recomputation.

6.2.12 Deleting Aggregated Food

Aggregated food with all its aggregated values can be deleted, but aggregated value alone cannot. Deletion does not affect contributing values.
For more details and procedure see chapter *4.2.7 Deleting Record*.

6.3 Management of Recipes

6.3.1 Recipes

FoodCASE contains the feature to calculate the composition of a food based on a classical recipe, i.e. meal (dish) with ingredients. The algorithm implemented follows the EuroFIR recommendation for recipe calculation (Reinivuo, H. et al., 2009). However, FoodCASE applies yield factors in a different way (see chap. *6.3.2 Applying Yield Factors*).
Recipes are always calculated using data from the Aggregated Values register or possibly Recipe register (i.e. a recipe can be used for calculation of another recipe), not from the Single Values register.
There are two ways of recipe calculation – using the Recipes register or using the Clipboard.
The values resulting from recipe calculation are marked with the same version as the underlying aggregated values. Calculated recipes are listed in both Aggregated Values and Recipe registers.

Note: The application does not warn user when one or more value in ingredient is missing. It may easily happen that the calculated recipe value will be not precise (probably lower) due to a missing contributing component.

6.3.2 Applying Yield Factors

Yield factor expresses loss or gain of dish weight during cooking. In FoodCASE it can acquire values between 0 and 1 (expressing loss of weight) or higher (expressing weight gain, for example water uptake for cooking rice is 2.5 times).
Application of yield factors is optional and it is up to compiler to choose appropriate factors (Vásquez-Caicedo, A. L. et al., 2007). While EuroFIR standard recommends applying total yield factor of dish to the raw weight of ingredients, FoodCASE applies individual yield factors to water, fat and alcohol of the total raw weight (Figure 6.3.2-1). When only total yield factor is known, individual yield factors for water, fat and alcohol can be calculated with a special calculator (Figure 6.3.2-2). However, for this calculation user needs to know how much from the total loss or gain goes for water, fat and alcohol (see Example 1).

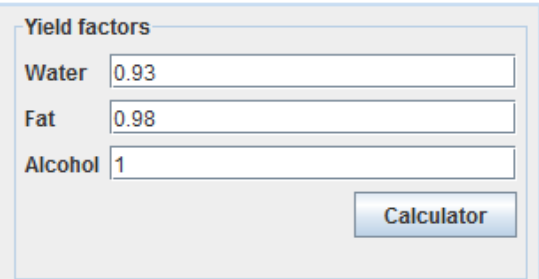


Figure 6.3.2-1: Yield factors for a dish can be entered directly by compiler or calculated by the Calculator

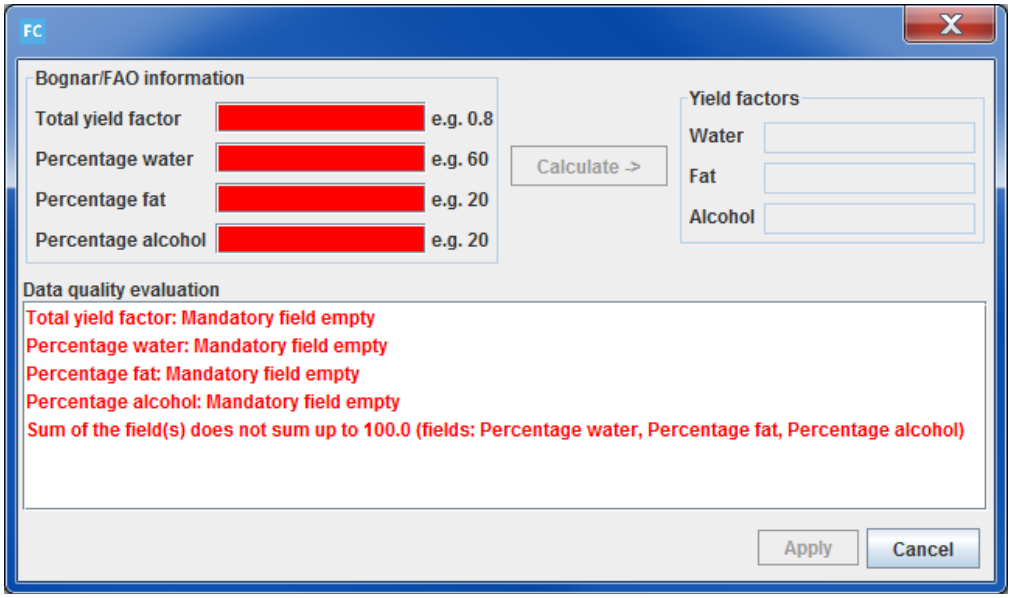


Figure 6.3.2-2: Use of the calculator is dependent on availability of total yield factor and how much of the loss goes for water, fat and alcohol

Example 1: Use of calculator for obtaining individual yield factors in a fruit cake

Available Information:
Total yield factor = 0.90
Loss = 0.10 (of which 81 % makes up water and 18 % makes up fat).
The calculator performs calculations to get individual yield factors for water and fat (Figure 6.3.2-3).

Calculations:
Yield factor for water = 1 – (81 * 0.1/100) = 0.92
Yield factor for fat = 1 – (18 * 0.1/100) = 0.98

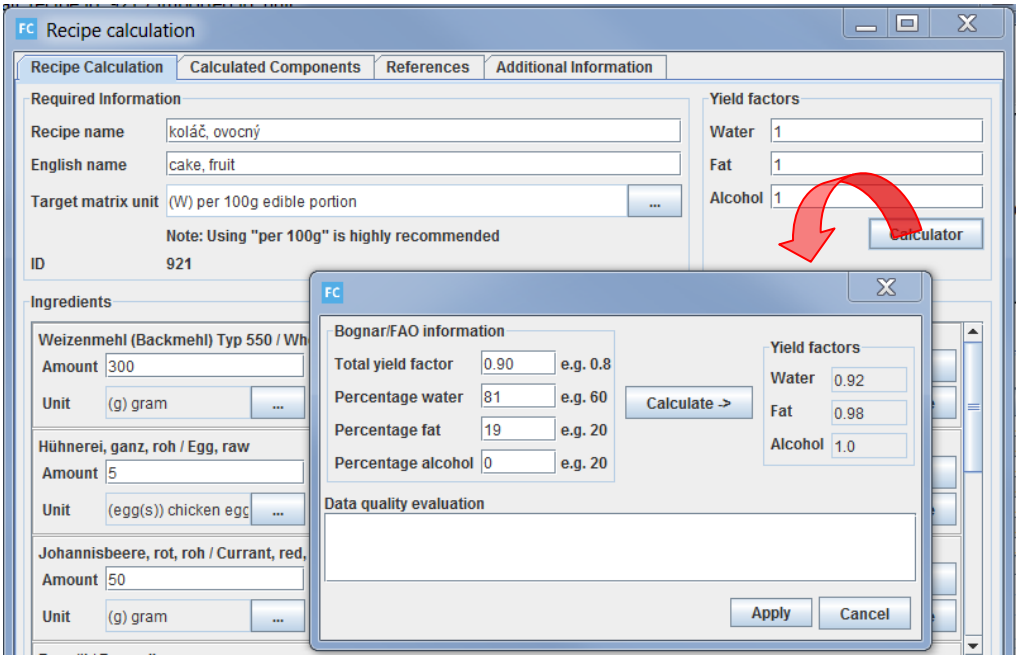


Figure 6.3.2-3: For calculation of the recipe in this example FoodCASE applies yield factor 0.92 and 0.98 for water and fat, respectively.

6.3.3 Applying Retention Factors

FoodCASE applies retention factors at ingredient level, i.e. separately to the nutrient content of each ingredient. Retention factors are included in the application. They are based on standardised list of retention factors proposed by EuroFIR (Vásquez-Caicedo, A. L. et al., 2007). User applies retention factors via preparation method. If several cooking methods are applied, the final retention factor results from combination of all retention factors, e.g. multiplication operation is used.

6.3.4 Tips for application of preparation methods

Documenting recipe procedure is important for proper selection of cooking methods.
If only one preparation method applies for the entire recipe, then one must select this preparation method for each ingredient.
Multiple preparation methods can be applied per ingredient (e.g. if an ingredient is first stir-fried separately and then baked in the oven).

6.3.5 Creating Recipe Using the Recipes Register

1. Go to the Recipes register
2. Click the **New...** button in the upper (Recipes) panel of the central working area
3. Complete at least mandatory information (red fields) in the opened Recipe calculation detail window (Figure 6.3.5-1 and 6.3.5-2):

- Enter the name of the recipe in original and English language
- Select the Target matrix unit from the drop-down list - it is recommended to use "(W) per 100 g edible portion"

4. Click the **Add new ingredient** button
5. Select an aggregated food which you want to use as an ingredient from the list by clicking on it (food filter is possible in the *Search* field) (Figure 6.3.5-3)
6. Repeat the procedure by using the **Add new ingredient** button and selecting all ingredients one after another (in case wrong selection use the **Remove selected ingredient** button) (Figure 6.3.5-4)
7. Insert the amount and unit of each ingredient and add the preparation method(s) if you want to apply retention factors in the calculation (retention factors are linked with the preparation method) (Figure 6.3.5-5)
8. Modify yield factors if needed for one of water, fat or alcohol
9. Click the **Calculate** button
10. Click the **Refresh** button in the upper (Aggregated foods/Recipes) panel of the central working area to upload new recipe to the food list
11. The new recipe is displayed in the upper panel of the Recipes register as well as in the Aggregated Values register - recipe composition is displayed in the middle panel and ingredients are displayed in the lower panel of the central working area (Figure 6.3.5-6)

Note: Matrix unit depends on what was selected during the recipe creation. The most frequent is expression per 100 g of edible portion.

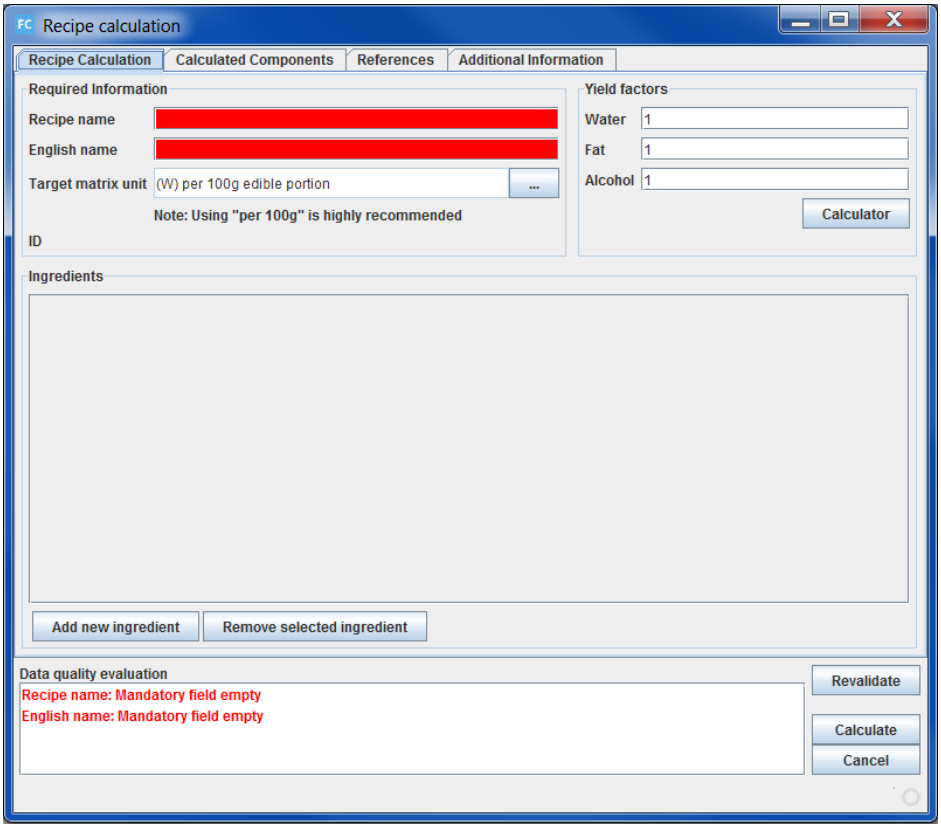


Figure 6.3.5-1

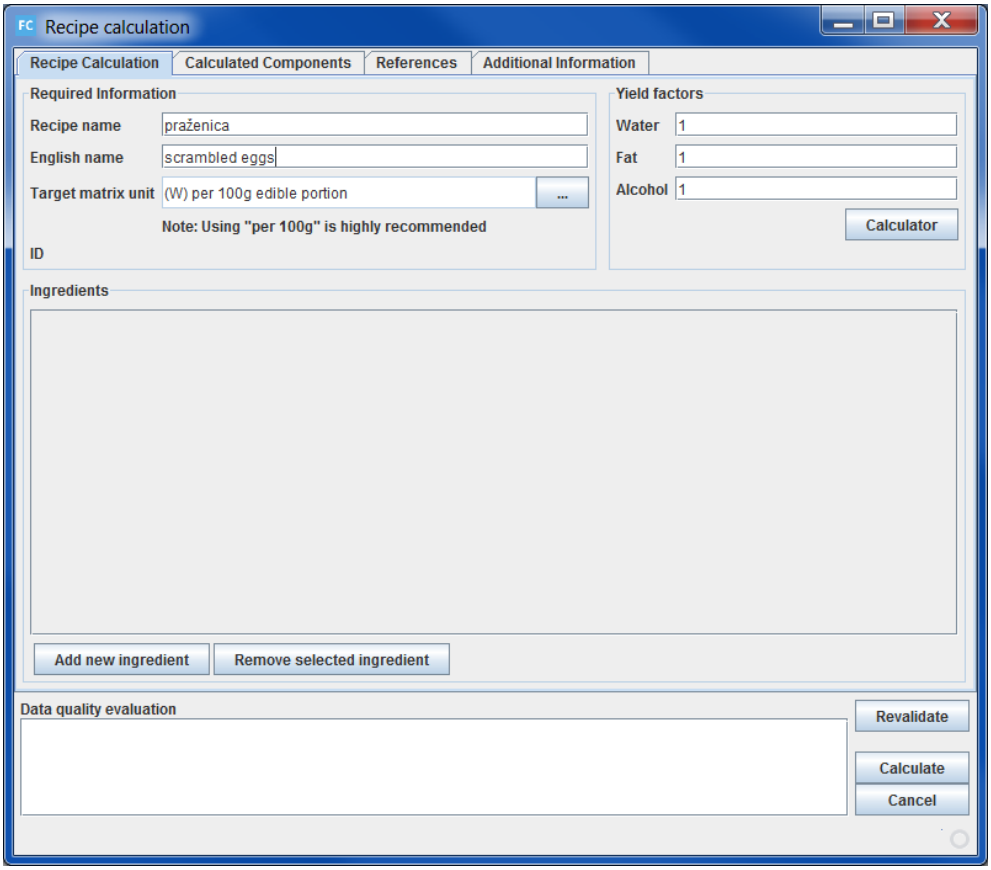


Figure 6.3.5-2

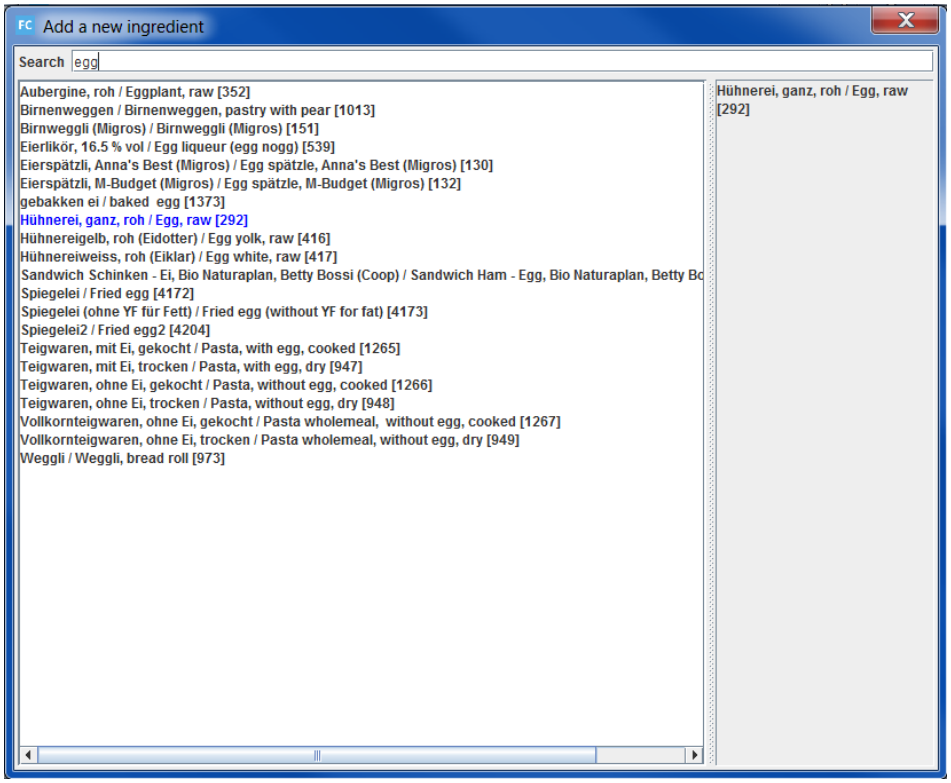


Figure 6.3.5-3

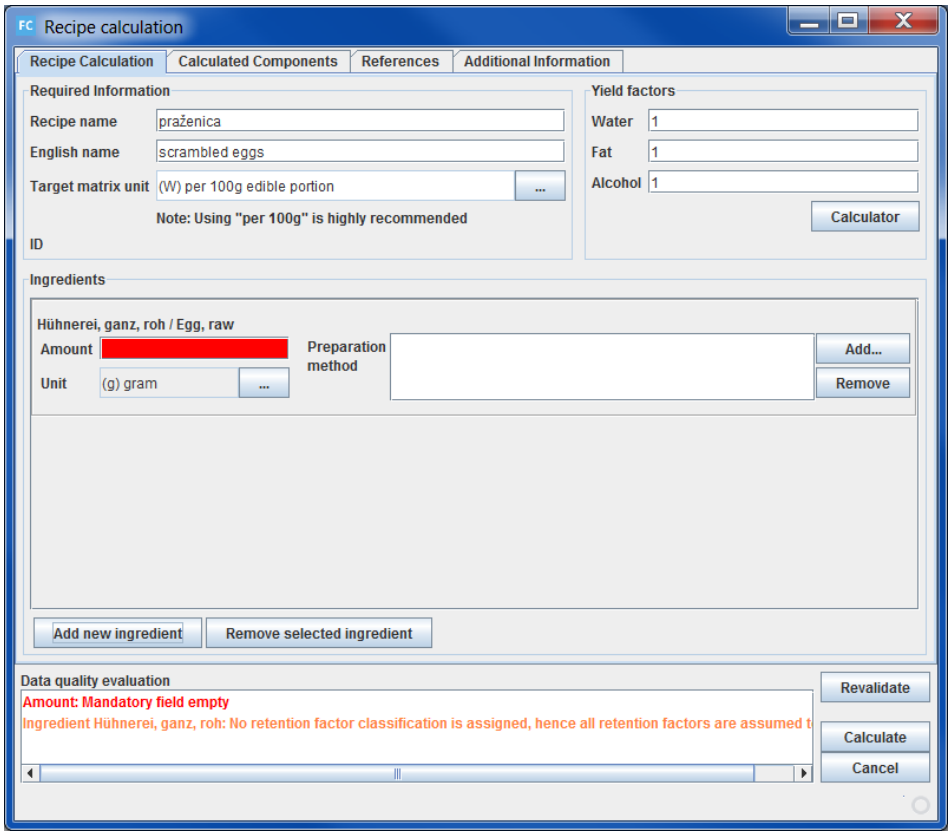


Figure 6.3.5-4

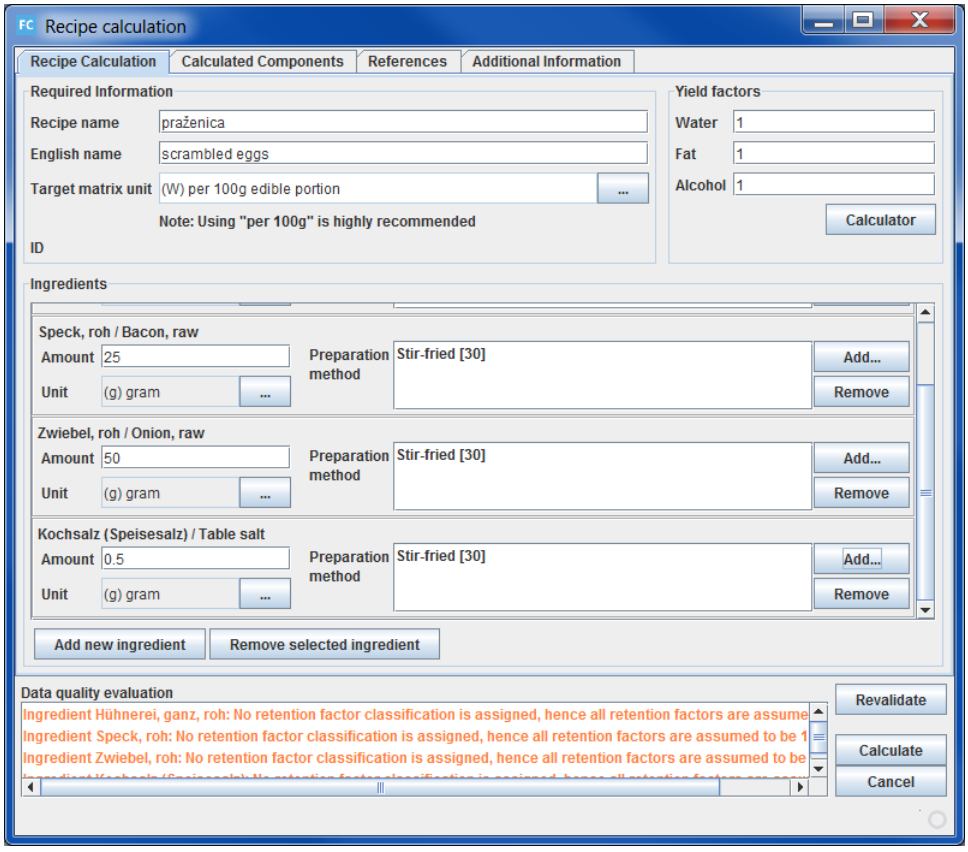


Figure 6.3.5-5

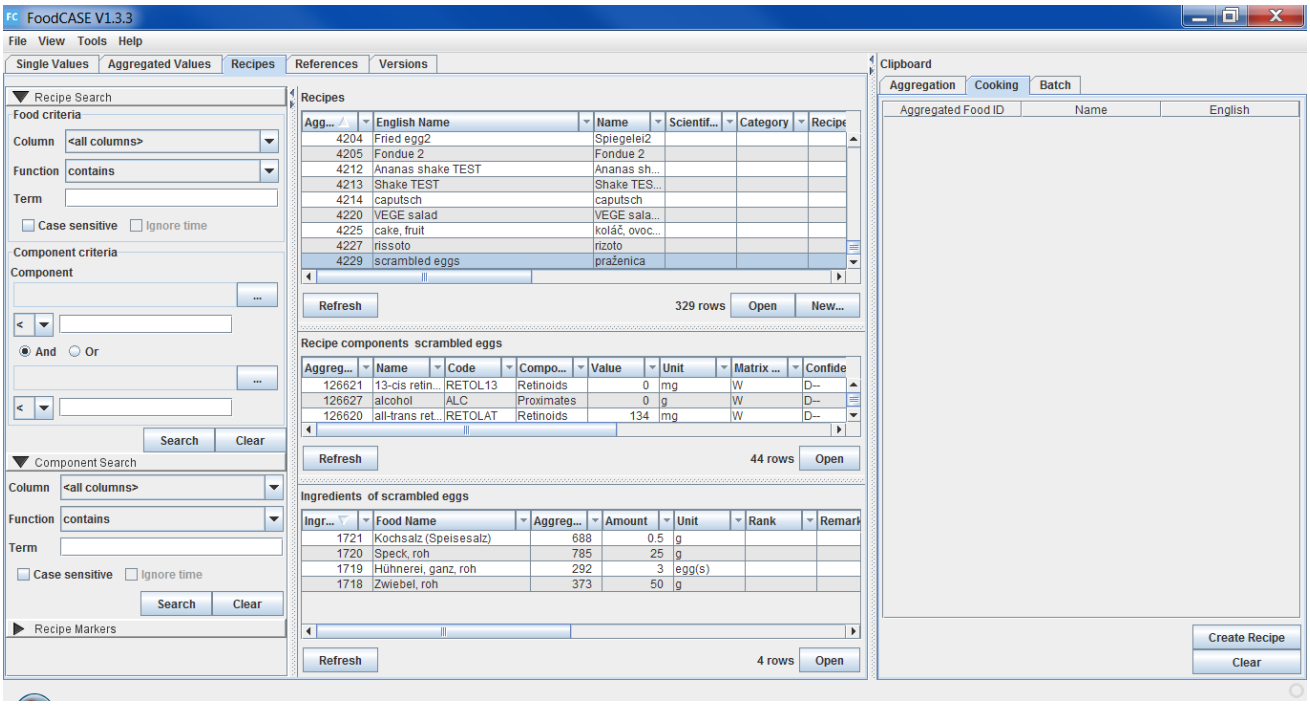


Figure 6.3.5-6

6.3.6 Creating Recipe Using the Clipboard

1. Go to the Aggregated Values (possibly Recipe register)
2. Select aggregated food(s) or recipe(s) which you want to use as ingredient(s) for recipe calculation in the upper (Aggregated foods) panel of the central working area by clicking on it (multiple selection is possible - press and keep **Ctrl** key and click on individual rows or press **Ctrl+A** keys to select all rows or drag cursor over next rows)
3. Right click on the one of the selected foods and choose the **Send to Clipboard** option (Figure 6.3.6-1)
4. Selected food(s) is copied into the Clipboard – Cooking (Figure 6.3.6-2)
5. Click the **Create Recipe** button at the bottom of the Clipboard
6. Complete at least mandatory information (red fields) in the opened Recipe calculation detail window (Figure 6.3.6-3 and 6.3.6-4):
   - Enter the name of the recipe in original and English language
   - Select the Target matrix unit from the drop-down list - it is recommended to use "(W) per 100 g edible portion"
7. Insert the amount and unit of each ingredient and add the preparation method(s) if you want to apply retention factors in the calculation (retention factors are linked with the preparation method) (Figure 6.3.6-3 and 6.3.6-4)
8. Modify yield factors if needed for one of water, fat or alcohol
9. Click the **Calculate** button
10. Click the **Refresh** button in the upper (Aggregated foods/Recipes) panel of the central working area to upload new recipe to the food list

11. The new recipe is displayed in the upper panel of the Recipes register as well as in the Aggregated Values register - recipe composition is displayed in the middle panel and ingredients are displayed in the lower panel of the central working area (Figure 6.3.6-5)

Note: Matrix unit depends on what was selected during the recipe creation. The most frequent is expression per 100 g of edible portion.

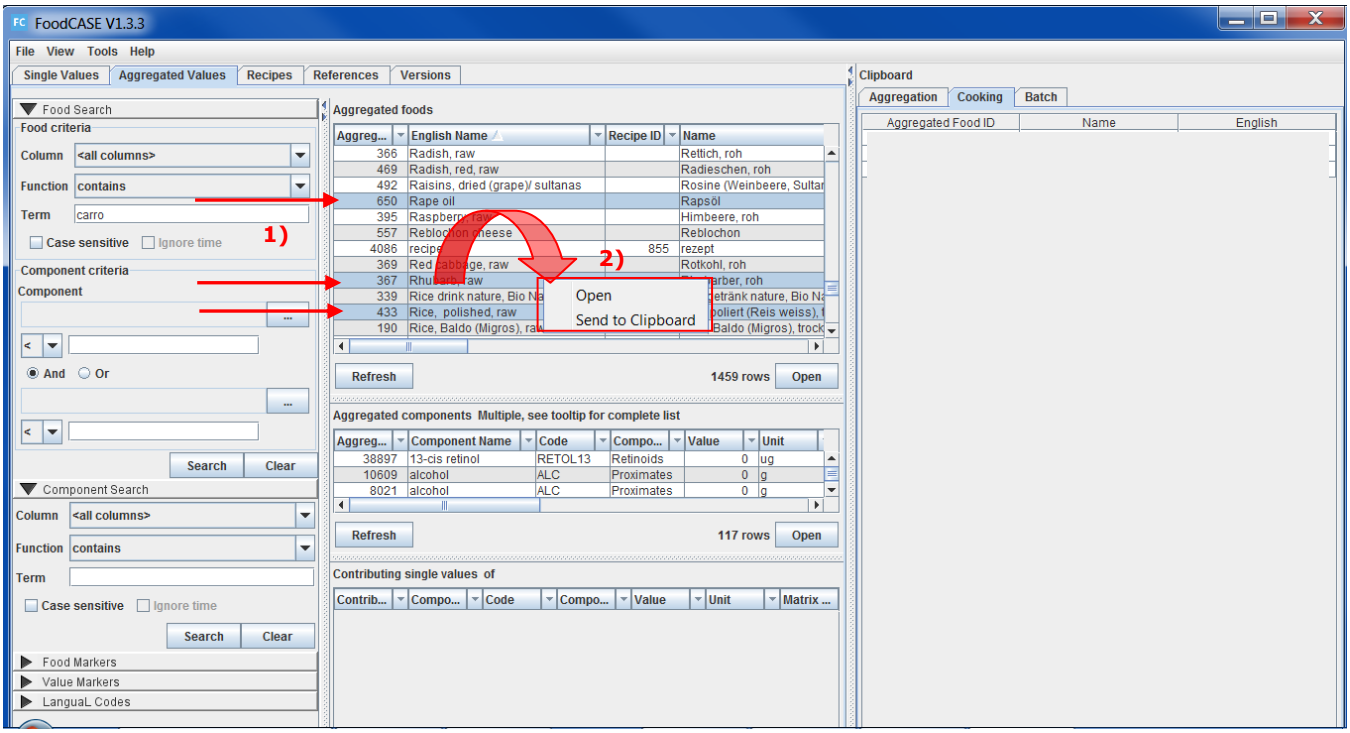


Figure 6.3.6-1

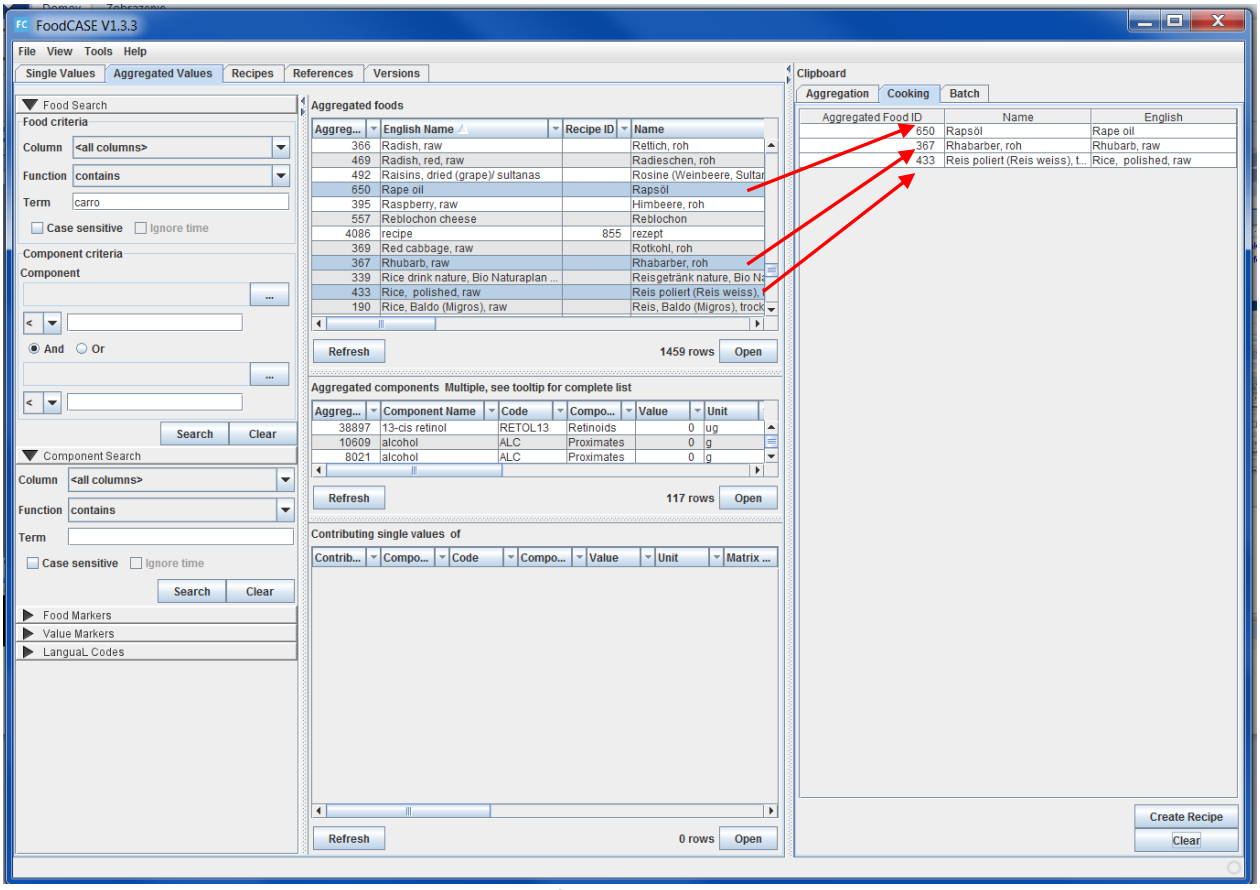


Figure 6.3.6-2

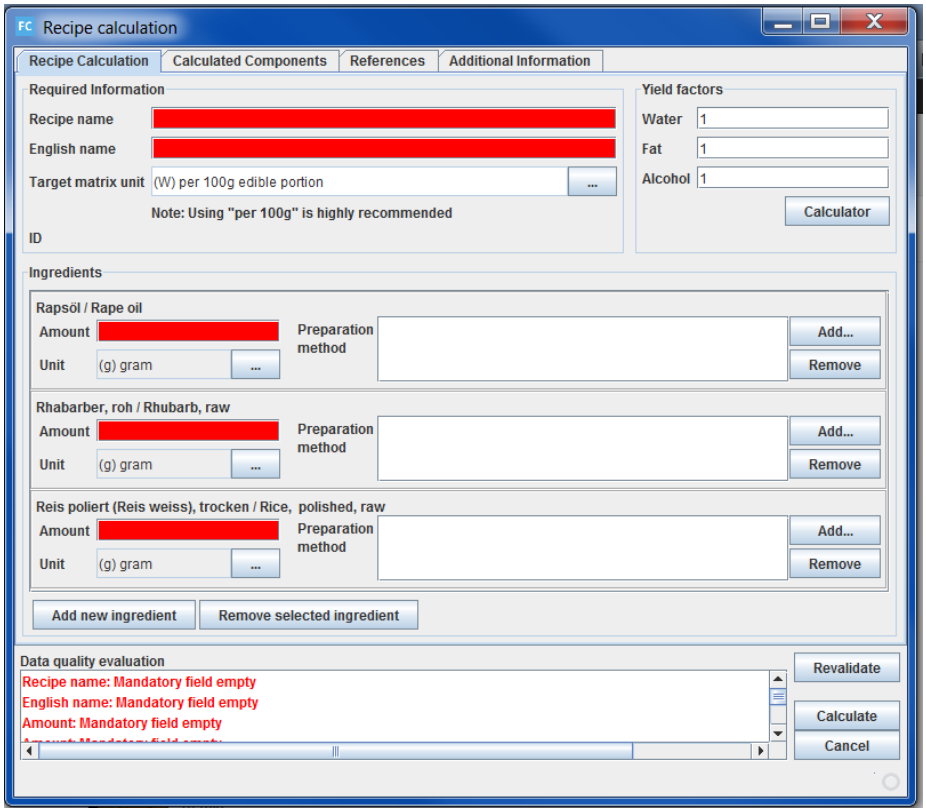


Figure 6.3.6-3

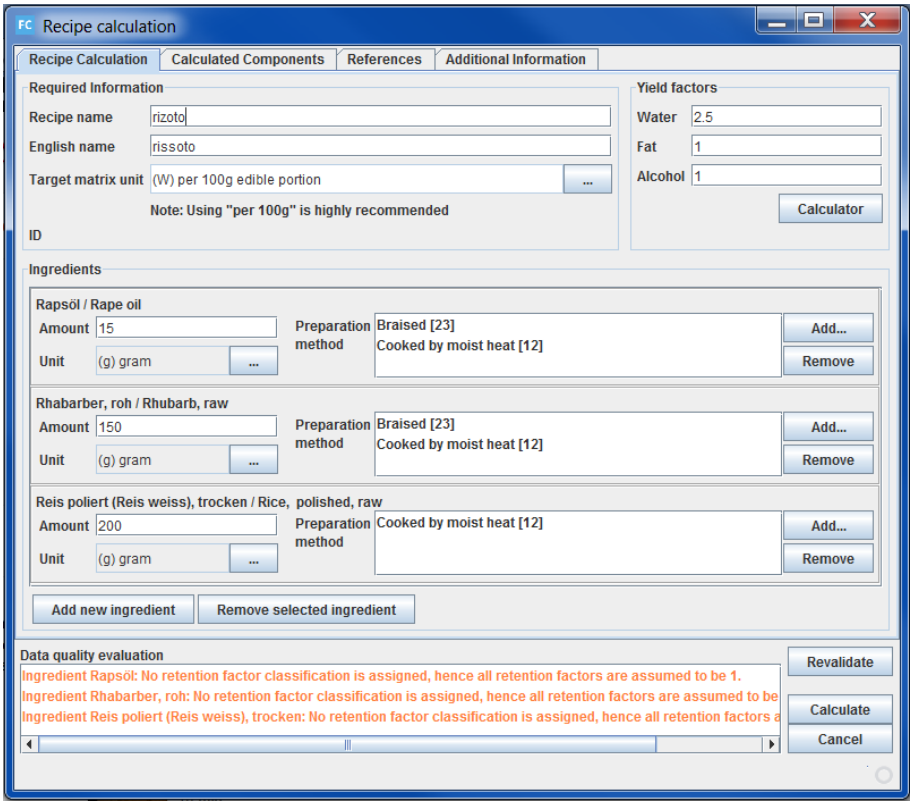


Figure 6.3.6-4

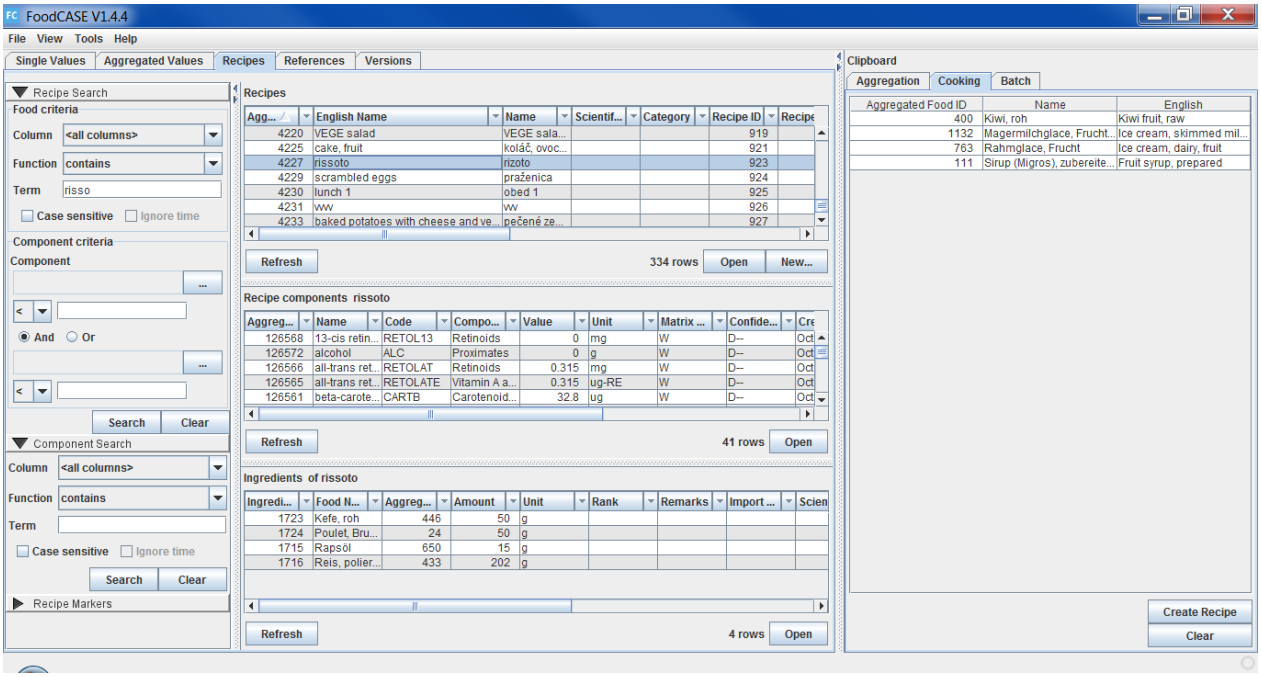


Figure 6.3.6-5

6.3.7 Adding Picture to Recipe

Picture of recipe should reflect the very own picture of calculated food.

For adding a picture to a recipe, follow the procedure described in chap. *6.1.2 Adding Picture to Single Food* that is applicable for uploading picture for foods at all database levels.

6.3.8 Duplicating Recipe

The duplication of neither recipe component value nor entire recipe (with all component values) is possible.

6.3.9 Recomputation of Recipe

For recomputation of a recipe follow the procedure in the chapter *6.2.9 Recomputation of Aggregated Food and Recipes*.

6.3.10 Modifying Recipe Ingredients

In case composition of an ingredient (and its amount) has been updated, recipe should be recalculated. Modification procedure of recipe allows change in:

- Recipe name
- Matrix unit
- List of ingredients and their amounts
- Preparation methods
- Yield factors
- Calculated components
- Description of meal preparation.

Modification procedure

1. Go to the Recipes register
2. Select the recipe you want modify in the upper (Recipes) panel of the central working area
3. Click the **Open** button to open the recipe
4. Click the **Modify recipe …** button
5. Modify the recipe by using the **Add new ingredient** button or the **Remove selected ingredient** and/or modify other relevant information (e.g. amounts, preparation methods, yield factors, calculated components) (Figure 6.3.10-1 – 6.3.10-4)
6. Click the **Calculate** button to recalculate the recipe
7. Close the Recipe detail window (Figure 6.3.10-5)
8. Click the **Refresh** button in the upper (Aggregated foods/Recipes) panel of the central working area to upload modified recipe to the food list (Figure 6.3.10-6)

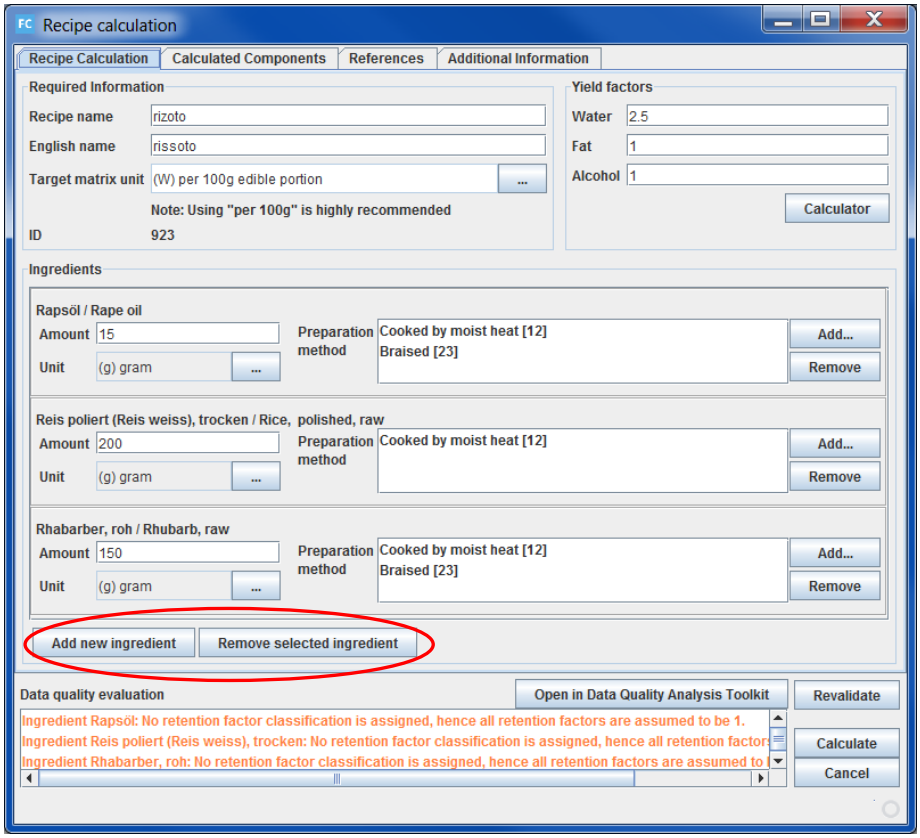


Figure 6.3.10-1: Original recipe

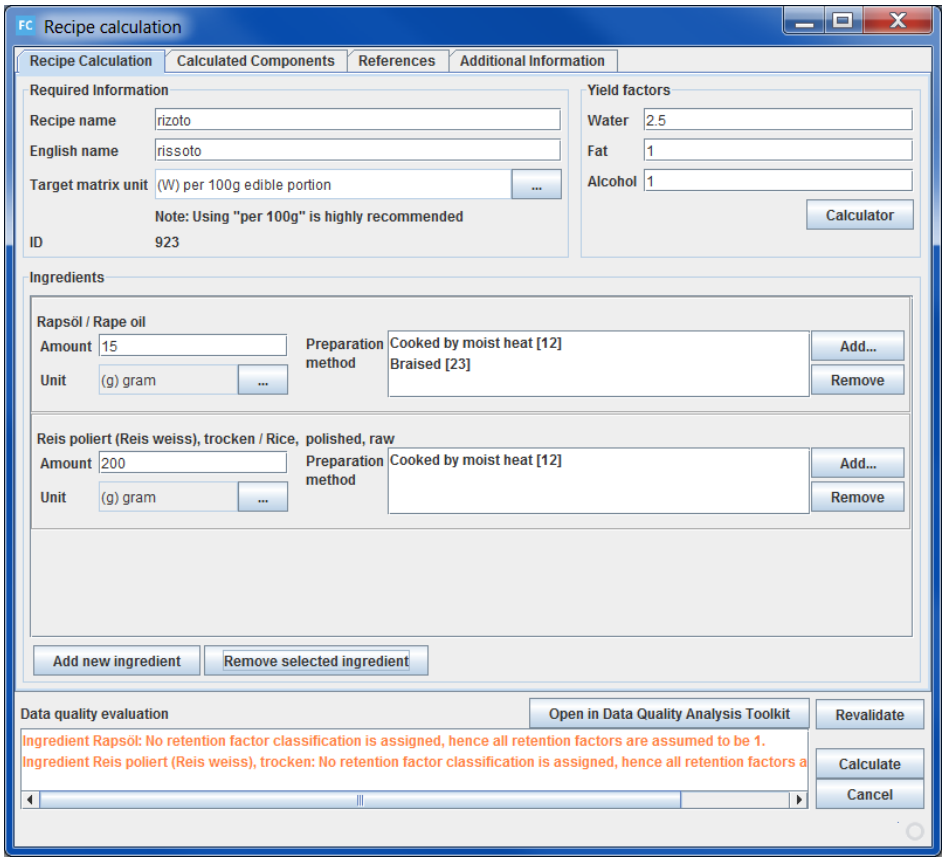


Figure 6.3.10-2: Removed one ingredient

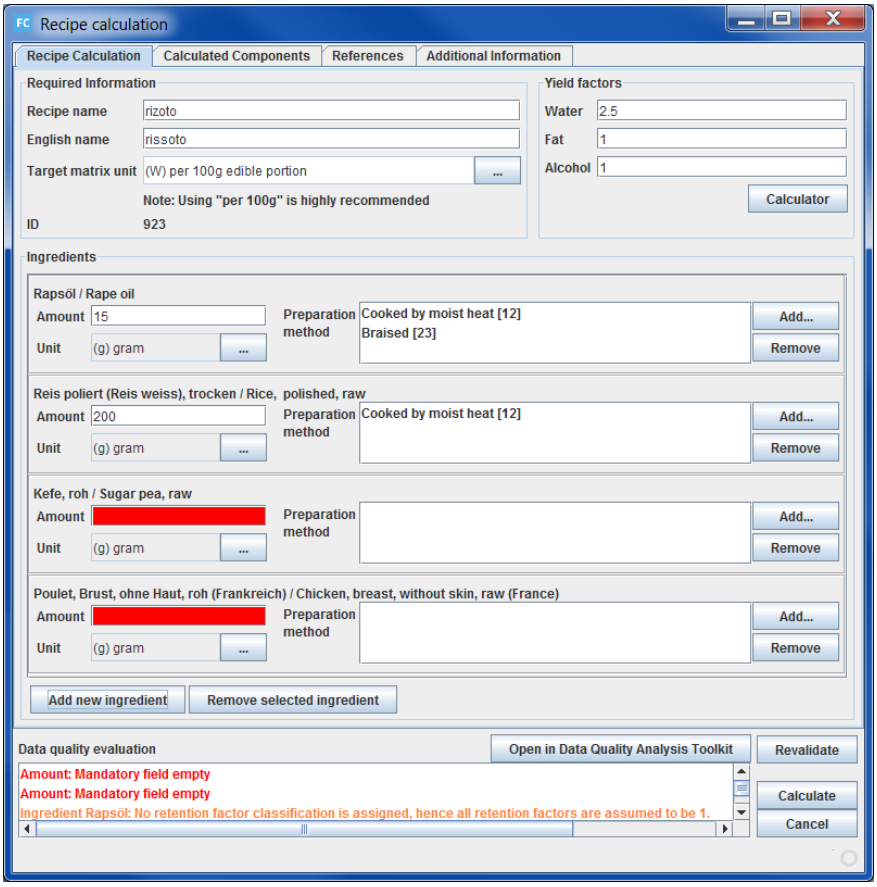


Figure 6.3.10-3: Added two new ingredients

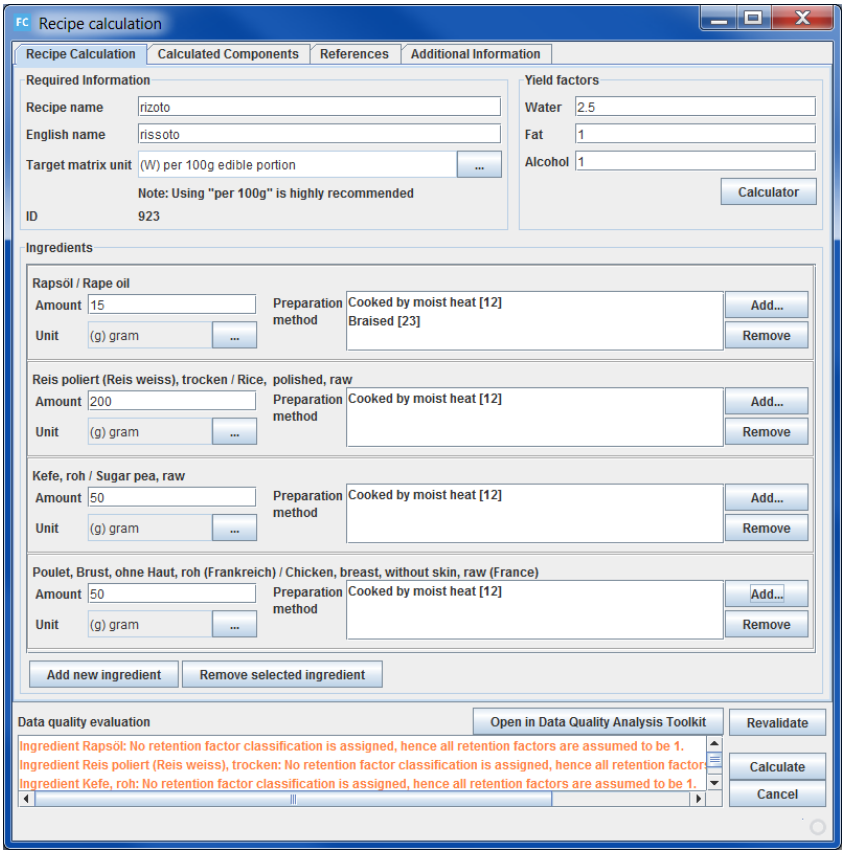


Figure 6.3.10-4

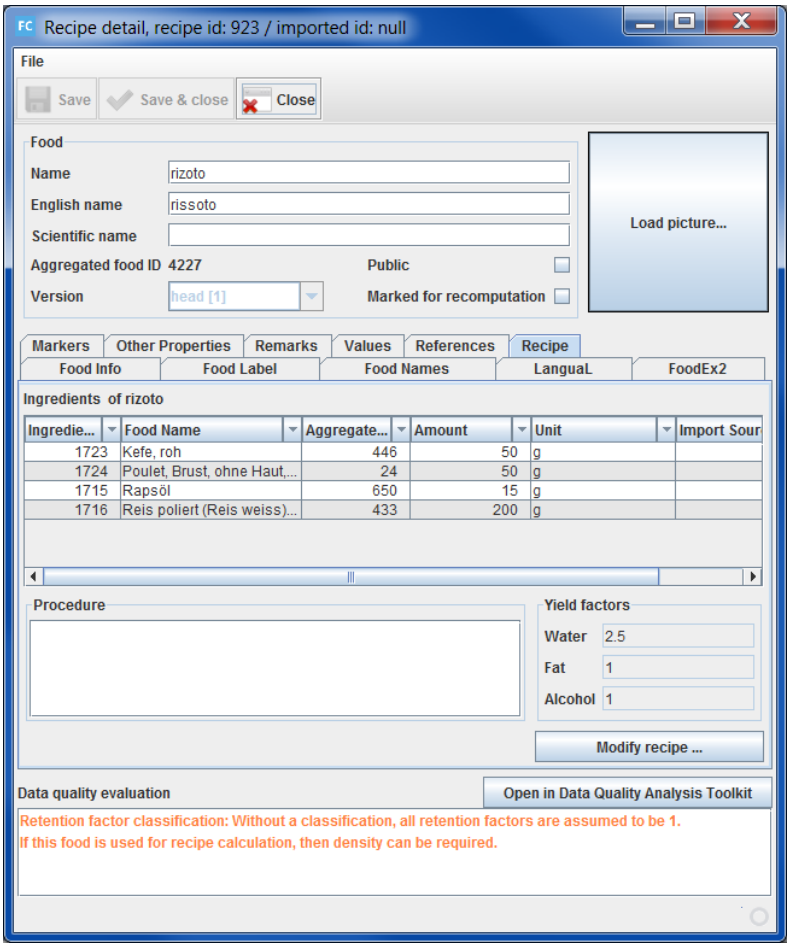


Figure 6.3.10-5

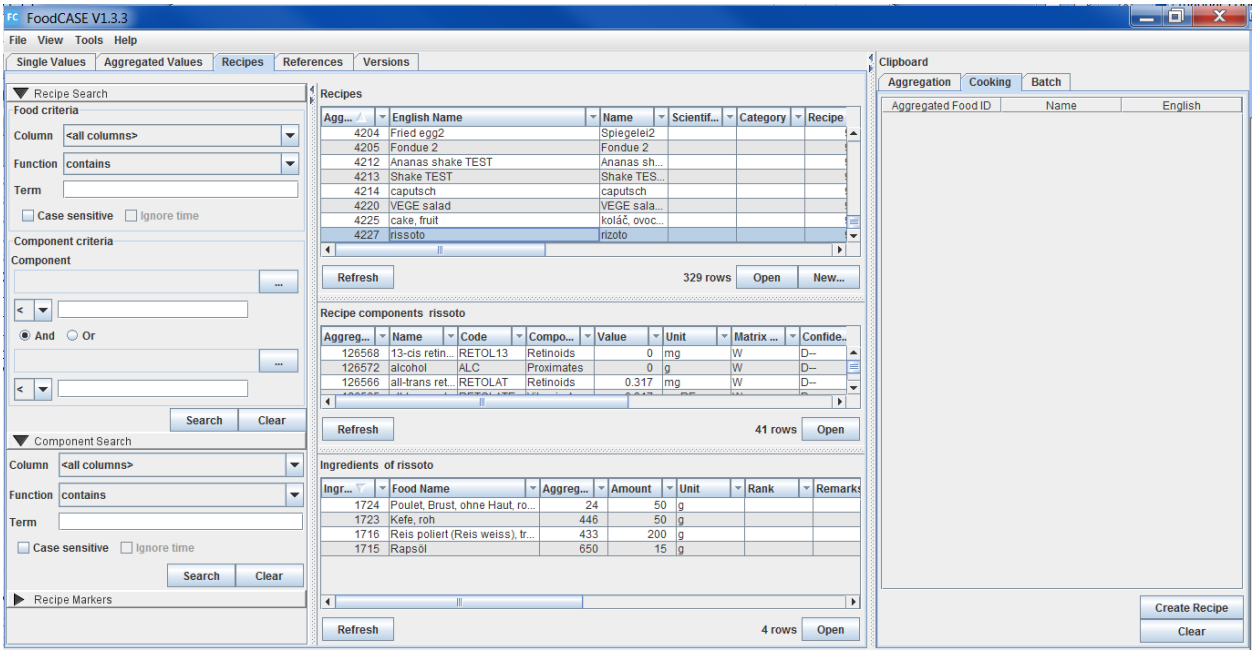


Figure 6.3.10-6

6.3.11 Modifying Recipe Values

Calculated recipe values can not be modified manually. They can be modified only within modification of the recipe by adding or removing ingredients and other properties and subsequent software calculation.

6.3.12 Deleting Recipe

Deletion of recipe is possible. However, deletion does not affect ingredients as such - foods listed in the Aggregated Values register. For more details and procedure see chapter *4.2.7 Deleting Record*.

6.4 Management of References

Almost all sort of information documented in FoodCASE can be referred to a reference. Register References keeps all references from which data and information were collected and can hold reference as such without particular connection back to data.

6.4.1 Adding New Reference

1. Go to the References register
2. Click the **New** button at the bottom of the central working area (Figure 6.4.1-1)
3. Complete at least mandatory information (red fields) in the opened Reference detail window (Figure 6.4.1-2)
4. If electronic reference file is available, click the **Search in folder** button next to the *File* field in the opened Reference detail window (Figure 6.4.1-3)
5. Search for reference in the Open dialog box and click the **Open** button (any data format is acceptable)
6. Click the **Save** (or **Save and Close**) button to save the information (Figure 6.4.1-4)
7. The new reference is displayed on the reference list (Figure 6.4.1-5)

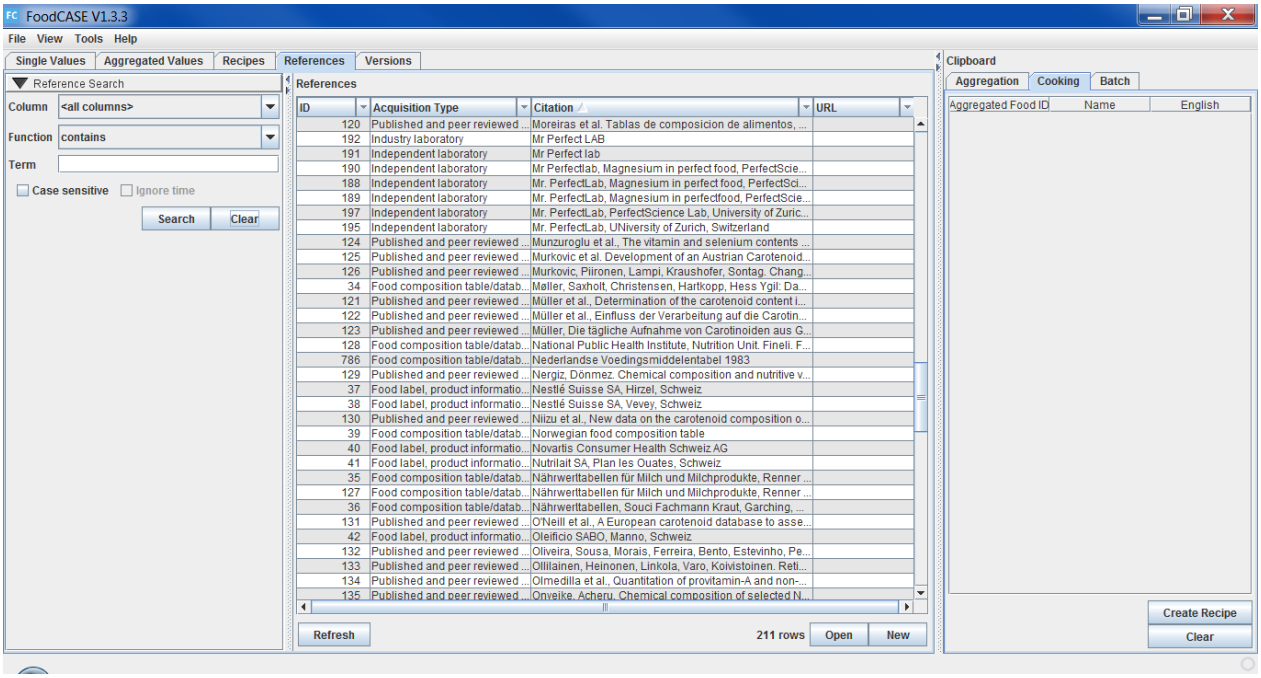


Figure 6.4.1-1

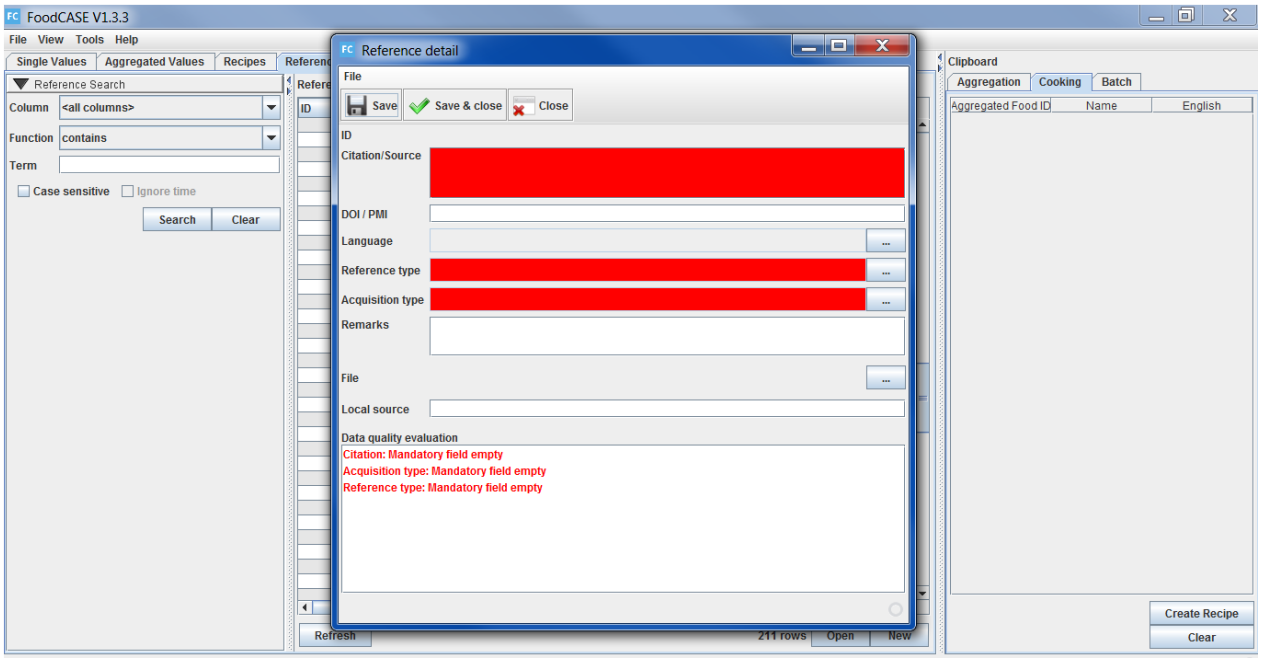


Figure 6.4.1-2

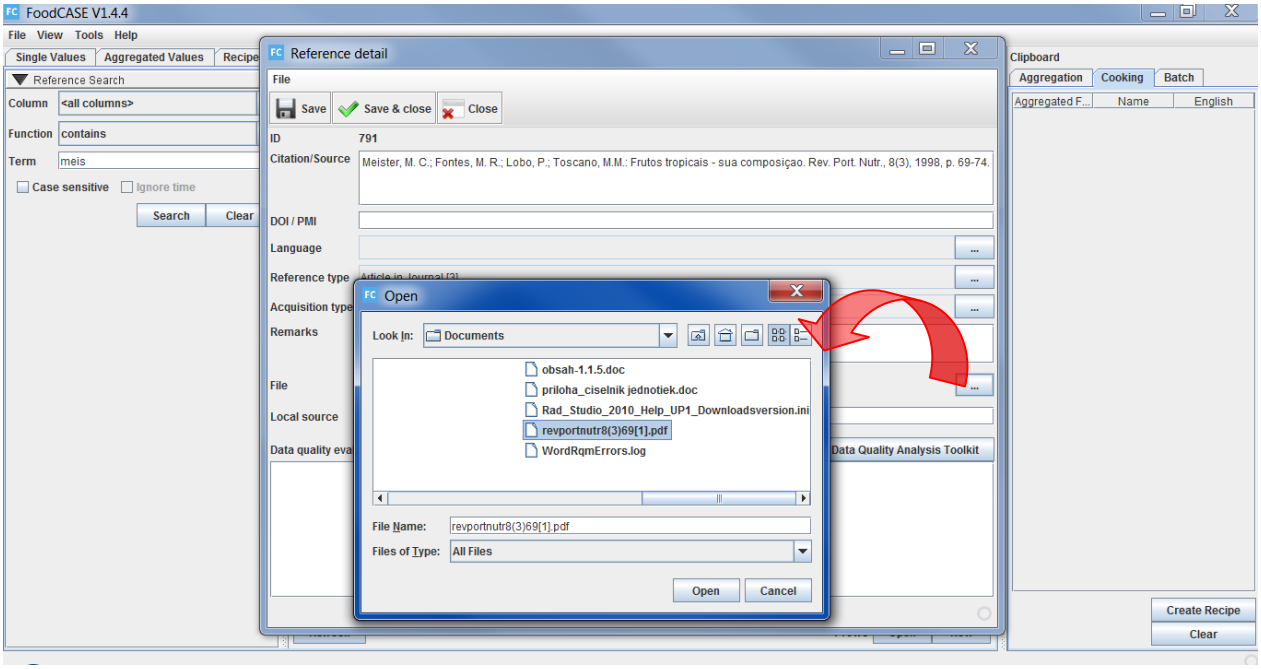


Figure 6.4.1-3

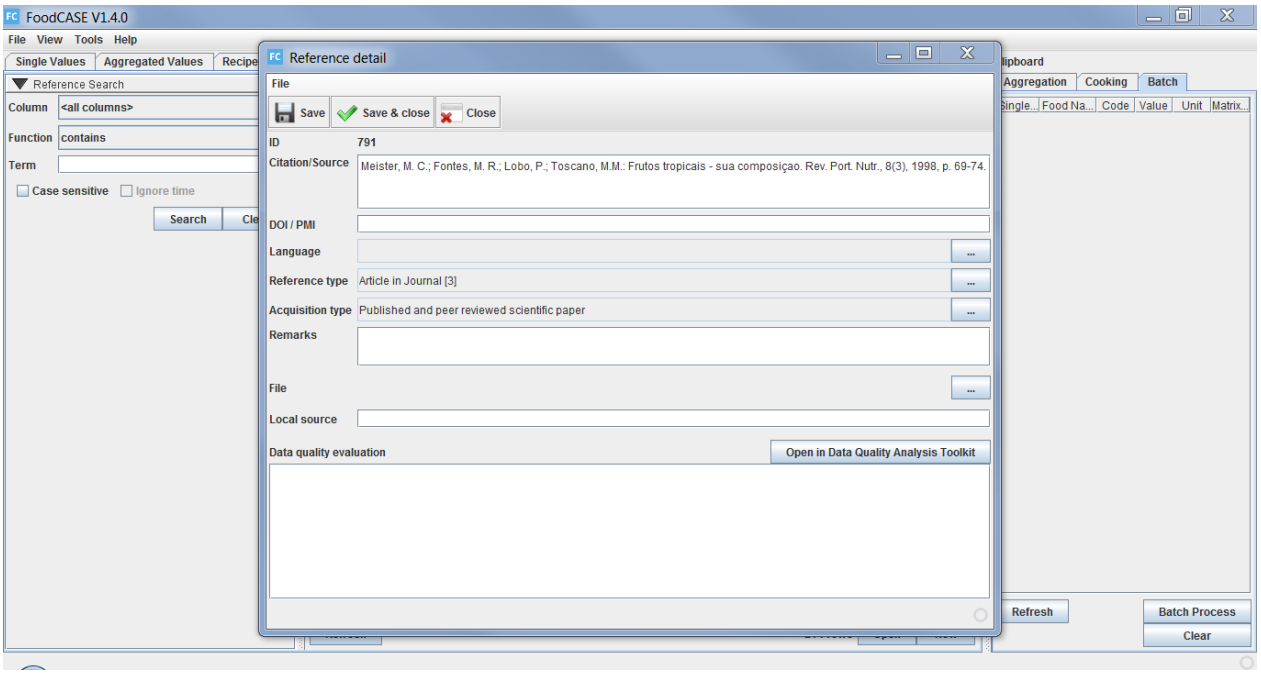


Figure 6.4.1-4

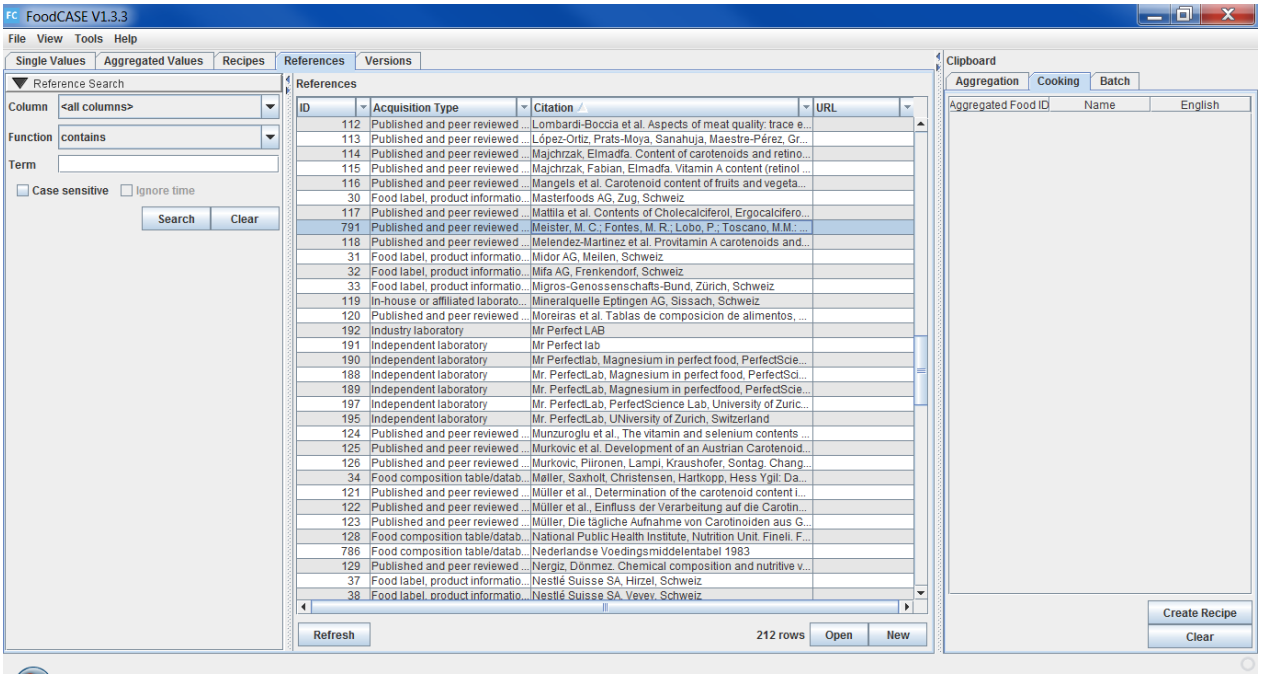


Figure 6.4.1-5

6.4.2 Uploading and Removing Reference File

1. Go to the References register
2. Select a reference for which you want upload a file
3. Double click on the reference row or click the **Open** button at the bottom of the central working area to open Reference detail window
4. Click the **Search in folder** button next to the *File* field in the opened Reference detail window (Figure 6.4.2-1)
5. Search for a file in the Open dialog box (Figure 6.4.2-2)
6. Select desired file and click **Open** button to load the file (any data format is acceptable) (Figure 6.4.2-3)
7. Double click on the file in the Reference detail window opens saved file
8. Click the **Save** (or **Save and Close**) button to save the information

*Note: For removing reference file, right click on a reference file and choose the **Remove** option. For saving a file on computer, right click on a reference file and choose the **Save as** option (Figure 6.4.2-4).*

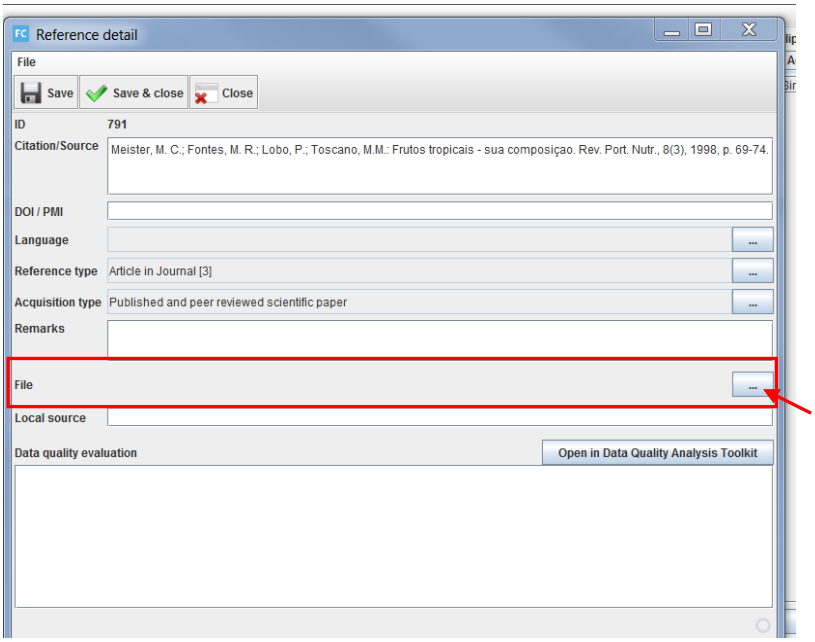


Figure 6.4.2-1

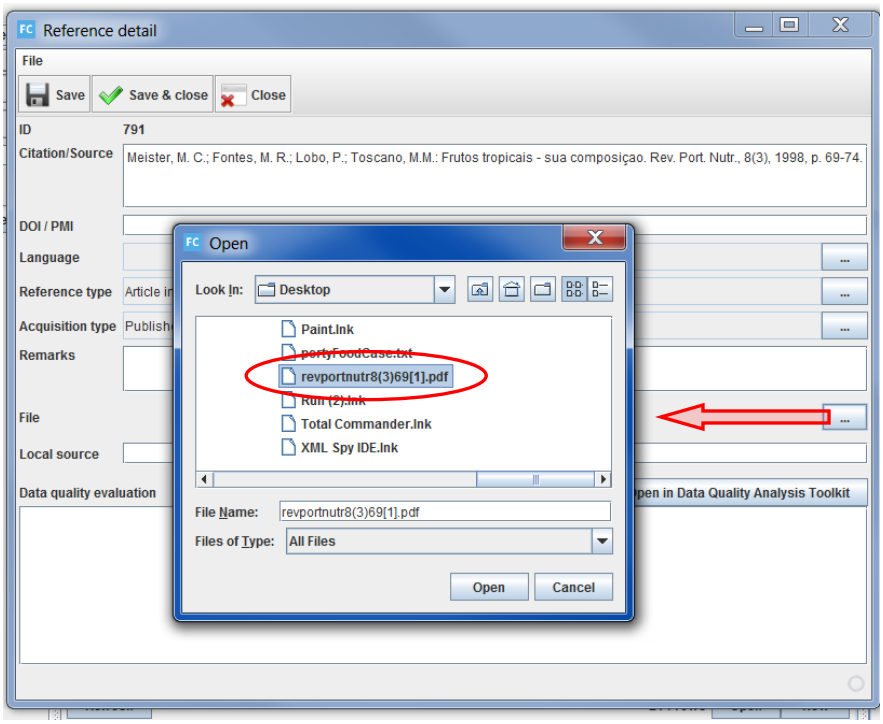


Figure 6.4.2-2

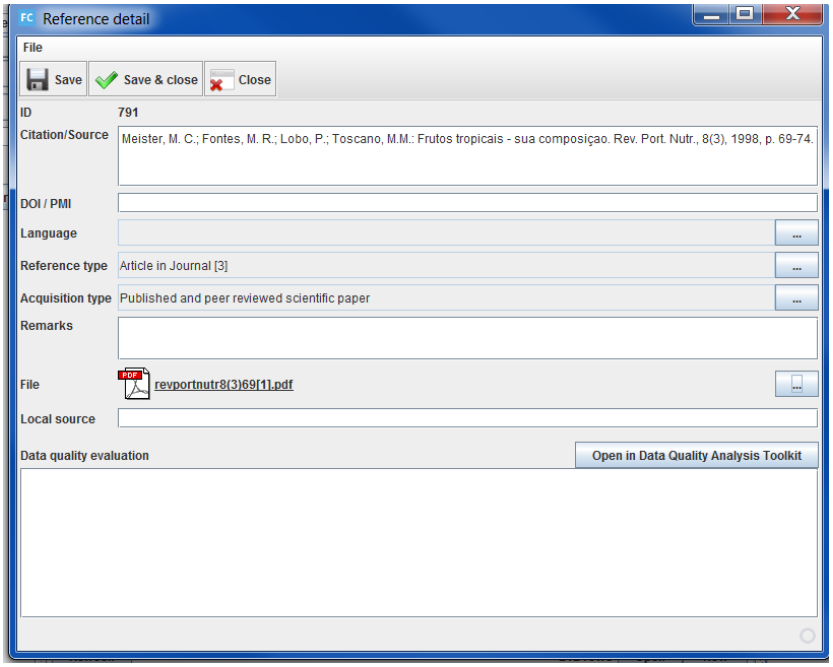


Figure 6.4.2-3

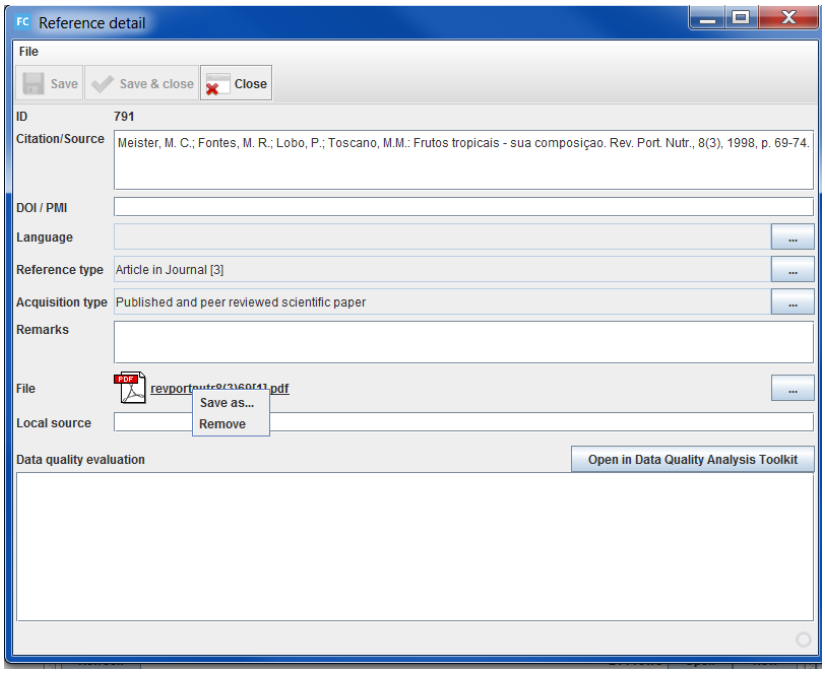


Figure 6.4.2-4

6.4.3 Updating Reference Information

Update or even complete change of reference information is possible.

1. Go to the References register
2. Double click on the reference which you want modify or click the row and **Open** button at the bottom of the central working area to open Reference detail window
3. Change required information of reference in the Reference detail window
4. Click the **Save** (or **Save and Close**) button to save the information

Note: Be careful when updating reference information. As soon as the citation is completely changed you might lose links between component values and original reference!

6.4.4 Deleting Reference

Deletion of reference is possible. However, user must consider consequences that might affect data quality because of loss of crucial information when the reference is referred in the database. For more details and procedure see chapter *4.2.7 Deleting Record*.

6.5 Versioning

Food composition data are continuously updated (e.g., new single values are documented and aggregated foods and recipes (re)computed). The aggregated value or recipe value is then a representative value for a certain version. For example, apple in version 1 has a value of 0.25g for total fat, while in version 2 the value is 0.30g. The version of aggregated database is usually published regularly or from time to time. For this reason, in order to new data and already published data do not mix up they have to be marked with a version (Example 2). The version of the database can be defined in the administration tool. The Administration Tool is accessible only for users with special rights (see *User Manual for Administration Tool of FoodCASE*).

Example 2:

As soon as a version (let say version 1) is published, then another version is set (let say version 2) that holds all data from previous version. The published version remains archival (version 1, fat 0.25 g in apple) and the new one is open for updating (version 2, fat 0.3 g in apple).
Old version remains inaccessible for modification of data. New version is accessible for modification in full access.
The new version contains aggregated foods with unique food codes that are different from previous versions even for the same aggregated food (Figure 6.5-1 and 6.5.-2). Actually, with a high probability the new version will be extended with new aggregated foods.

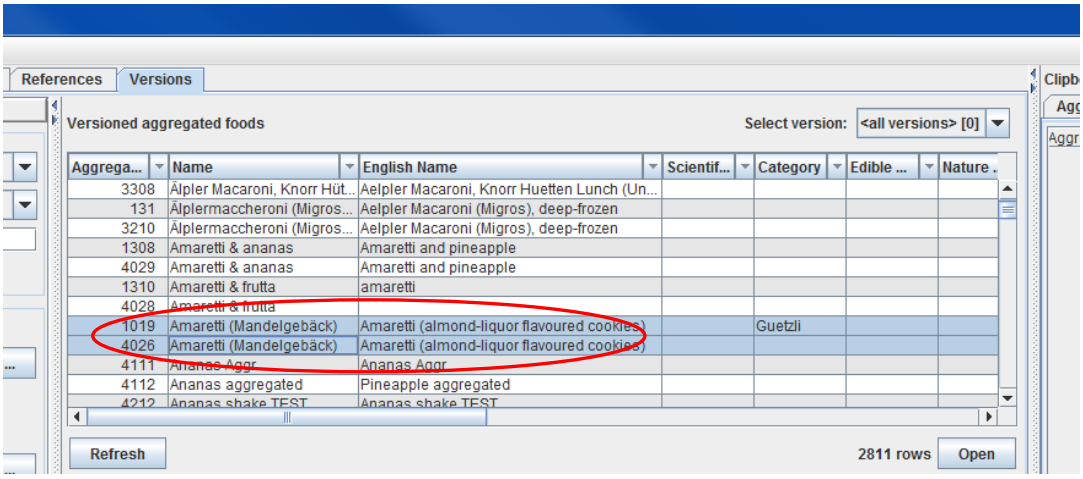


Figure 6.5-1: Amaretti cookies differ in food codes, because each belongs to a different version of aggregated database, regardless the aggregated values are identical or not

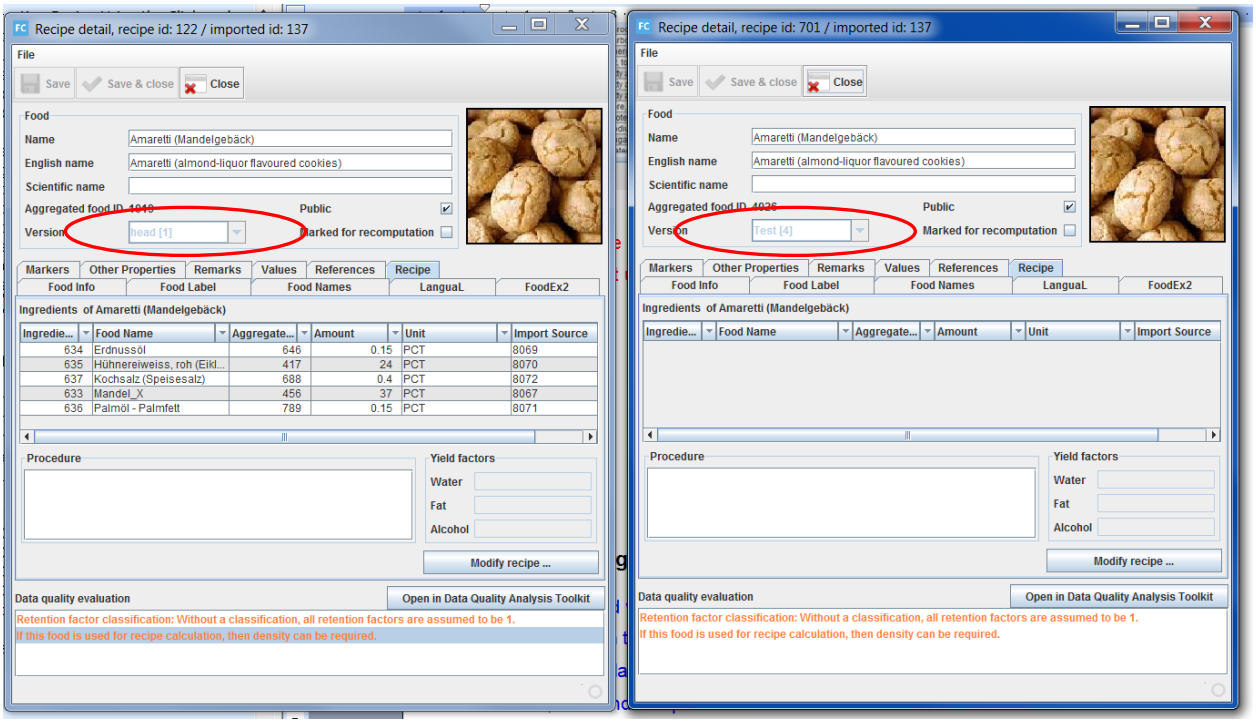


Figure 6.5-2: View of amaretti cookies from two database versions

6.5.1 Working with Versions

By creating a new version all data from the previous version (e.g. version 2010) will be copied into the new version (e.g. version 2012). An overview of all existing versions in FoodCASE is in the Versions register in the drop-down list Select version (Figure 6.5.1).

A user can get overview of foods within a version or display all versions altogether.

Version of the database is indicated for each food in food detail window.

In addition, there is a special column Public indicating whether the food is ready for publishing or not using words “true” or “false” (Figure 6.5.1). This is important feature in order to really well

evaluated data are selected for publishing and also to indicate that record does not need further check or assessment. Data ticked for Public can be automatically exported and published (e.g. where to? into eSearch facility?).

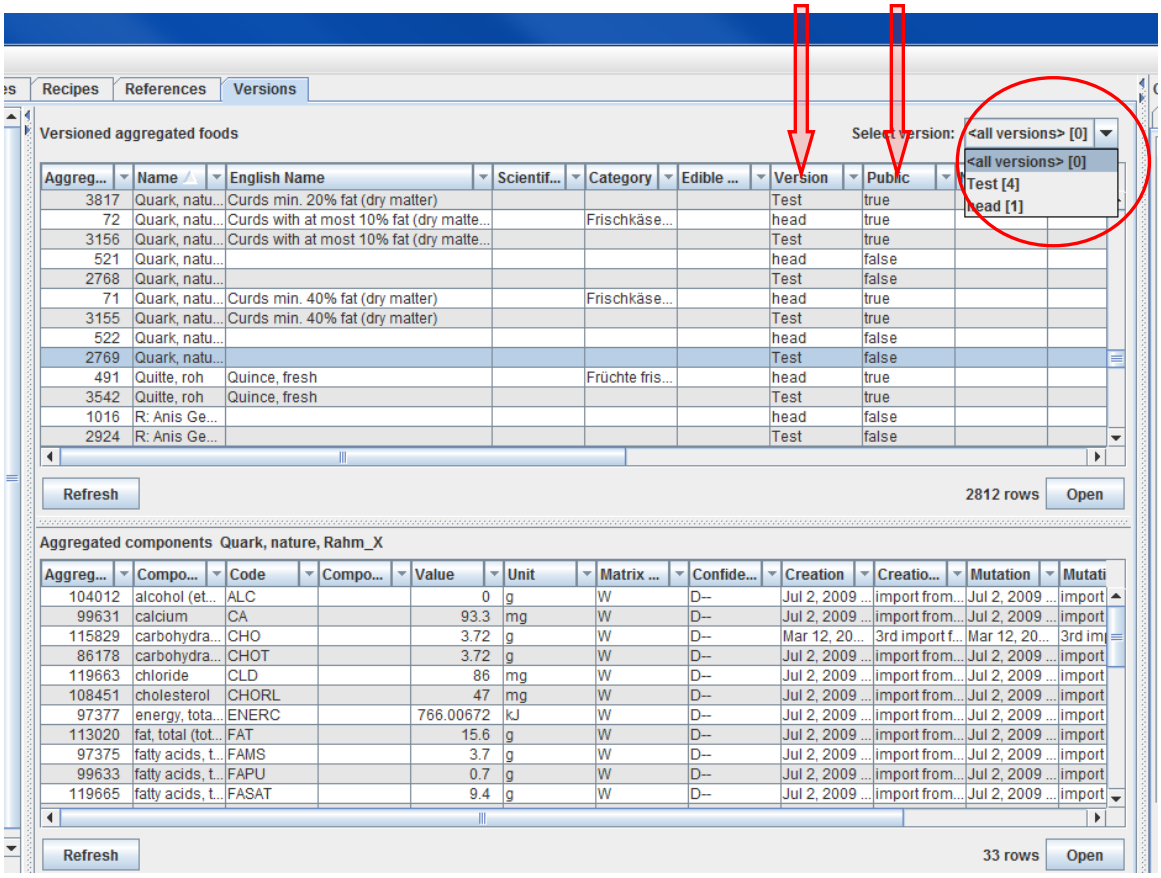


Figure 6.5.1

6.5.2 Creating a New Version

New version of the database can be created in the Administration Tool. The Administration Tool is accessible only for users with special rights (see *User Manual for Administration Tool of FoodCASE*).

6.6 Publishing Data

Publishing data is a critical process, because unintentional publishing or publishing of not validated data easily lead to a loss of credibility of an organisation or can endanger data end-users. FoodCASE has a publication module in the Administration Tool, where an administrator can manage existing database versions and select a version to be published.
Food composition information managed with FoodCASE can either be directly published online with the FoodCASE webpage or exported somewhere else (e.g. EuroFIR eSearch Facility). Only aggregated values having the status “Publishable” can be published.

6.6.1 Publishing on FoodCASE Website

The information to be published on the FoodCASE website (note: needs more details), from which the food compositional data can be viewed online, is defined at three levels: database version, food and component.

Compiler is authorized to select which foods will be shown on the website by marking them for publishing. However, only administrator with special rights may use module to generate a website.

Database version

The version of the database to be published can be defined in the Administration Tool.

Foods

Only foods that are on the Aggregated Values level can be published. Foods are selected for publication at the food level, i.e. one can decide for each food if it shall be published or not. Each Aggregated food detail window contains a special check box *Public*. Checked box ("*True*") means that aggregated food is ready for publishing and unchecked box ("*False*") vice versa. In the Version register there is a column *Publish* indicating whether the food is ready for publishing or not, using words "*True*" or "*False*".

Components to be published on the website

Components are selected for publication at the component level for the entire set of foods. If the component "protein, total" is selected for publication, then the protein value of all foods selected for publication will be published. To select a component for publication check the "*Public*" box in the Components EuroFIR Thesaurus in the Administration Tool.

6.6.2 Publishing on EuroFIR eSearch website

The EuroFIR Food Transport Package V1.1 is implemented in the FoodCASE software. This enables a direct linking to the EuroFIR eSearch facility, where multiple food composition databases can be searched at the same time.

6.7 Batch Processing

In case a large set of values contains identical information, it is time-consuming to enter and store this information for each record manually. FoodCASE allows assigning identical information to several values at once using the Clipboard and batch processing functionality (e.g. one can add information to Remarks field for all values that are stored in the Clipboard-Batch). This functionality is applicable only for single values and the operation must be carried out with care.

Batch processing procedure

1. Go to the Single Value register
2. Select the foods in the upper (Single foods) panel of the central working area to which you want assign identical information (click on a row and drag the mouse over next rows or keep **Ctrl** key and left click on individual rows)
3. Select the target components of the selected foods in the lower (Single components) panel of the central working area (click on a row and drag the mouse over next rows; keep **Ctrl** key and left click on individual rows or press **Ctrl+A** keys to select all rows)
4. Click the **Clipboard** button
5. Selected components are copied into the Clipboard – Batch (Figure 6.7-1)
6. Click the **Batch Process** button
7. Add or change information that is desired for selected values in the Single value detail - Batch mode window (Figure 6.7-2)
8. Click the **Save and Close** button to save the information
9. Successful batch processing is confirmed in message window (Figure 6.7 -3)
10. Click the **Refresh** button in the lower Single components panel to upload the changes (Figure 6.7-4)

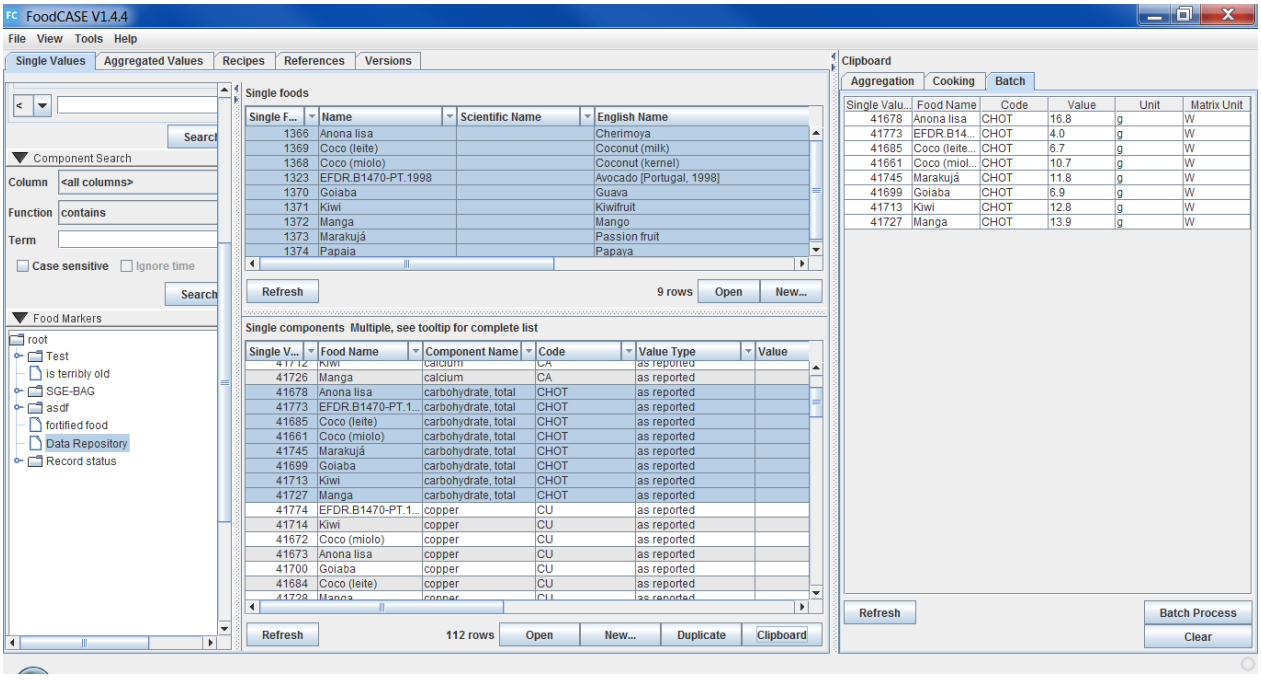


Figure 6.7-1

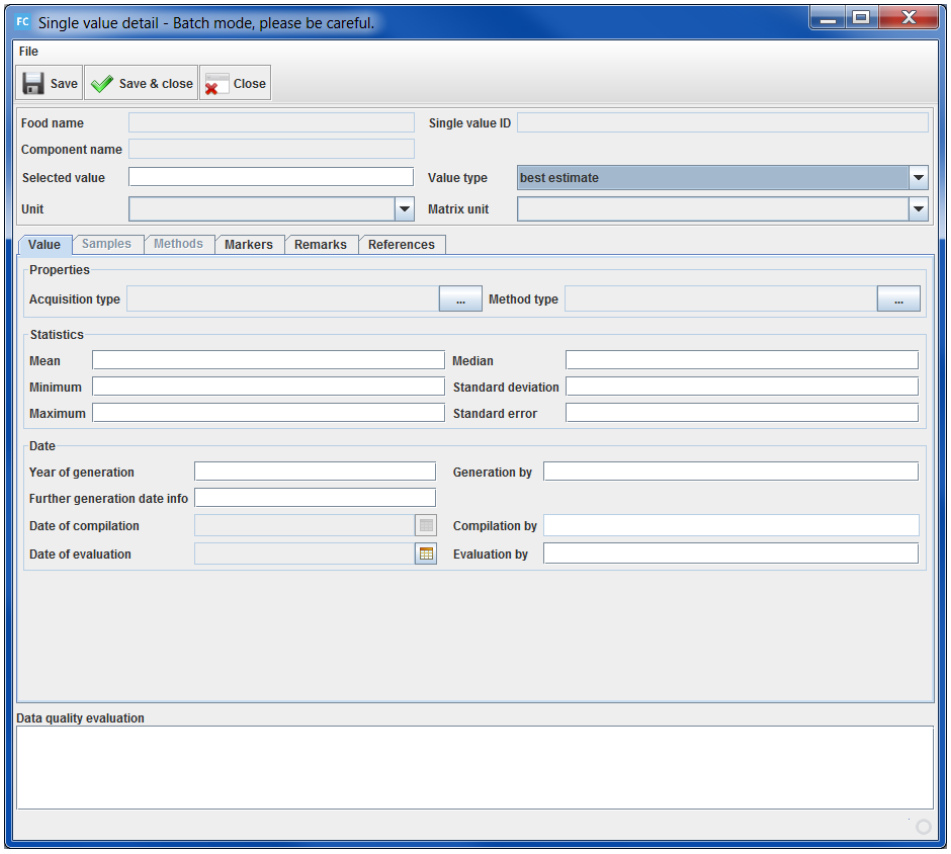


Figure 6.7-2

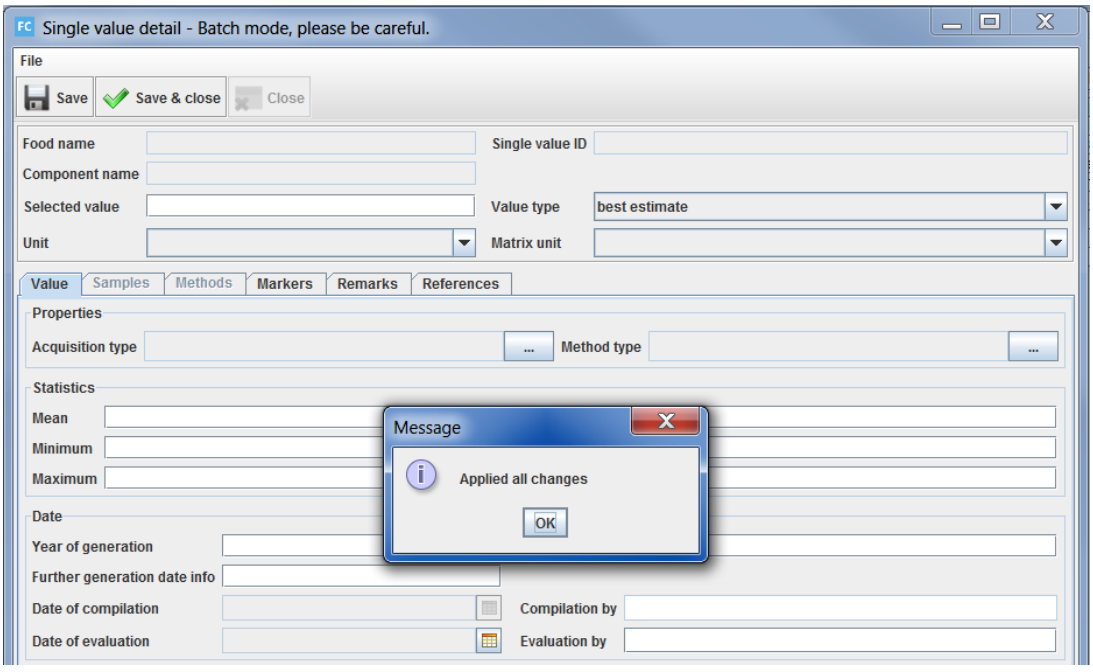


Figure 6.7-3

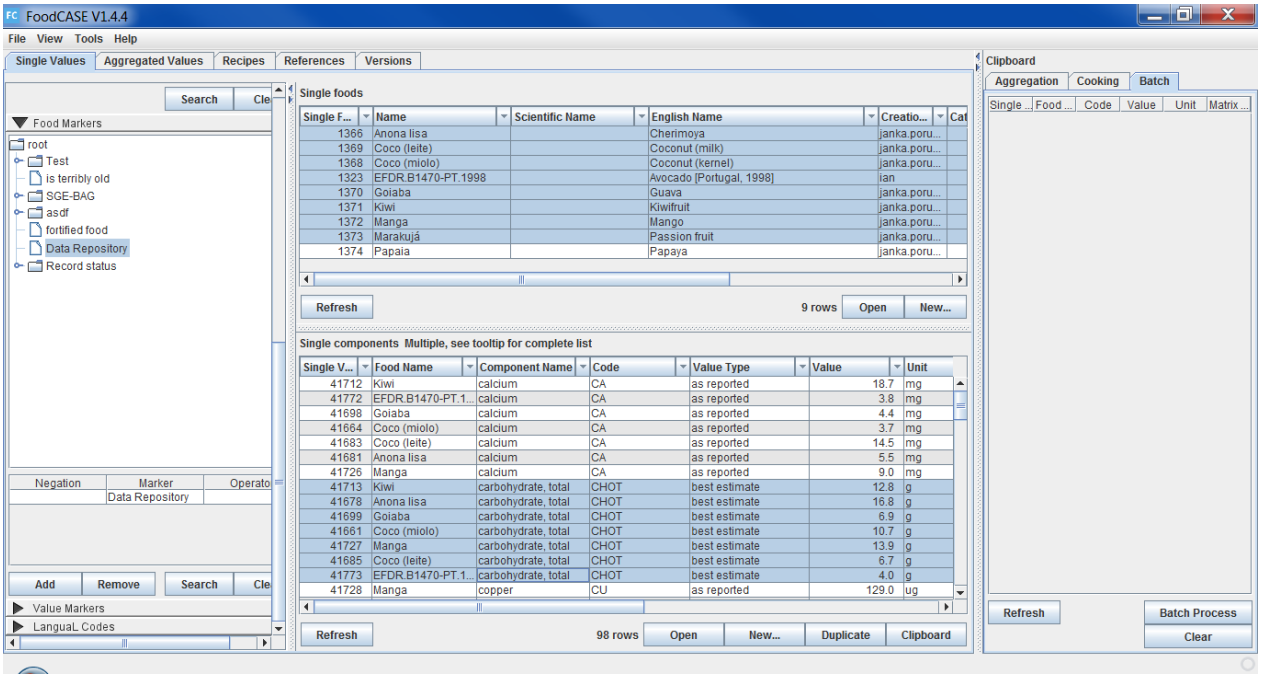


Figure 6.7-4: Value type for carbohydrates, total in eight tropical fruits was changed from “as reported” to “best estimate” descriptor

6.8 Some General Rules for Data Compilation

6.8.1 Logical Zero

If it is assumed that the component does not occur in the food, e.g. alcohol in meat, or fat in mineral water, then the

1. Selected Value must be "0"
2. Value Type must be "Logical zero"
3. Method Type must be "Estimated according to logical deduction [U]"
4. Acquisition Type must be "Value created within host-system [S]"
5. Reference must be the compiler organisation itself.

In the case of the selected value being assigned as '0' due to regulatory requirements, use the Method Type "estimated according to regulatory requirements [L]"

6.8.2 Calculated components

Aggregation procedure and recipe calculation includes also creation of calculated values (e.g. energy value, sum of fatty acids, vitamin A activity, etc.). Calculation procedures are predefined, i.e. there is a standardized list of calculation methods available in FoodCASE. Due to legislative novelisation and different conventions there might be two or more calculation procedures listed for a component. When one of the required components in aggregated food in formula is missing, FoodCASE prevents calculation. However, in recipes when required components in formula for one or all ingredients are missing, FoodCASE does not prevent calculation. This means that calculated components in recipes might not be precise.

Calculated components are accessible for update when aggregated food or recipe is modified.

6.8.3 Weights

In food composition databases representative value for a food is usually calculated as arithmetic mean. That means that values do contribute to the result equally.
To consider differences in food consumption, market distribution of foods, seasons and other aspects compilers use weighted mean to calculate representative value. For calculation of weighted mean, weights are usually applied to emphasize contribution of some value in a set of values to generate a representative value.
In FoodCASE user can define own weights and decide on calculation methods for representative value. User defines weights when aggregating new food (Figure 6.2.5-3) or modifying existing aggregated food.
In FoodCASE weight acquires values from 0 to 1.

7 Data Quality

The data quality scope in FoodCASE is covering control aspects such as

- Consistency checks,
- Automatic controls of data input that ensures proper data type,
- Control of data calculations to indicate or prevent calculation when contributing data is missing (except recipe calculations),
- Data quality analysis that helps to assign a quality index and confidence code to data based on scoring relevant qualitative aspects.

7.1 Data Quality Warnings

Warnings indicate that some core information is missing and consistency is disturbed or data quality decreased. Warnings are displayed during the work with database in the Data quality window at the bottom of the central working area. They are shown in red and orange colour (Figure 7.1).
While orange warnings indicate lack of recommended, but optional information and might influence final data quality, red fields and warnings indicate missing of mandatory information. This means that missing information must be completed, otherwise information is not stored.

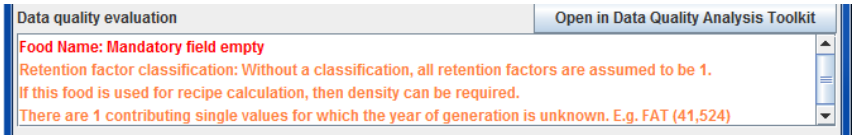


Figure 7.1

7.2 Data Consistency Check

For database consistency, there are automatic controls set for data input in FoodCASE:

- Check the uniqueness of the names (e.g. original food name),
- Data types (e.g. numbers, string, decimal point, date) - each item of record may have assigned rules for its format. Meeting the rules is checked whenever the field is completed and abandoned. Without filling in a correct format user is not allowed to save the information.
- Selection of descriptors from standardized thesauri – selection of standardized descriptors is compulsory.

In order to nurture a required database quality and representativeness one can set requirements on the data in order the database fits for purpose. These parameters are managed in the *Menu Tools → Configure Warnings.* Currently only fixed list of warnings exists.

7.3 Data Calculations

Applied calculation procedures are standardized procedures that should ensure comparability of data and allow for their interchange. The standard calculation procedures are used for:

- Data aggregation,
- Calculated (derived) components (sums of fatty acids, energy value based on algorithms defined in method indicator),
- Recipe calculation.

Calculation procedures for aggregation and recipe calculation are automatic and user has no influence on them. However, calculated (derived) components are optional. It is up to user what formula applies for calculation or whether uses it at all.

7.4 Data Quality Analysis

Quality Assessment System is a special evaluation system of food composition data for data interchange. There is a standardized method for quality assessment defined by EuroFIR (Oseredczuk, M. et al., 2009). Quality evaluation module in FoodCASE follows this standardized method and evaluation is automatic.

7.4.1 Quality Index Attribution Procedure

For quality index attribution, it is expected that compiler studies carefully available metadata and evaluates available information for datum objectively. In general, quality index evaluation requires complex information about food, not only about component value.

User scores different aspects of food composition data directly in the application and FoodCASE derives **quality index (QI)** for evaluated single value. Quality evaluation is based on a set of criteria that are assessed within each of following categories: 1. food description, 2. component identification, 3. sampling plan, 4. number of analytical samples, 5. sample handling, 6. sample analysis and 7. analytical quality control.
Compiler answers the question within each category. Each category receives a score from 5 for high quality to 1 for low quality. All scores are then summed to form the QI, ranging from 35 (high quality) to 7 (low quality).
The following procedure can be used also for revalidation of quality index.

Procedure

1. Go to the Single Values register
2. Select the single value to which you want attribute (or revalidate) a quality index
3. Double click on the value or click the **Open** button in the lower (Single components) panel of the central working area (Figure 7.4.1-1)
4. Click the Quality Index bookmark (Figure 7.4.1-2)
5. Click the **Edit questions**… button
6. Answer the questions in all 7 categories based on available meta information (information that is not relevant, N/A radio button, is not included to quality index calculation) (Figure 7.4.1-3)
7. Click the **Save and Close** button to save the information
8. Answer additional quality questions and score them (5 - high quality to 1 - low quality) (Figure 7.4.1-4)
9. Click the **Save** (or **Save and Close**) button to save the information
10. Quality Index for each single value is displayed in a separated column (Figure 7.4.1-5)

Note: If no data assessment is done on a datum, FoodCASE assign the lowest quality index (7.0) to a particular value.

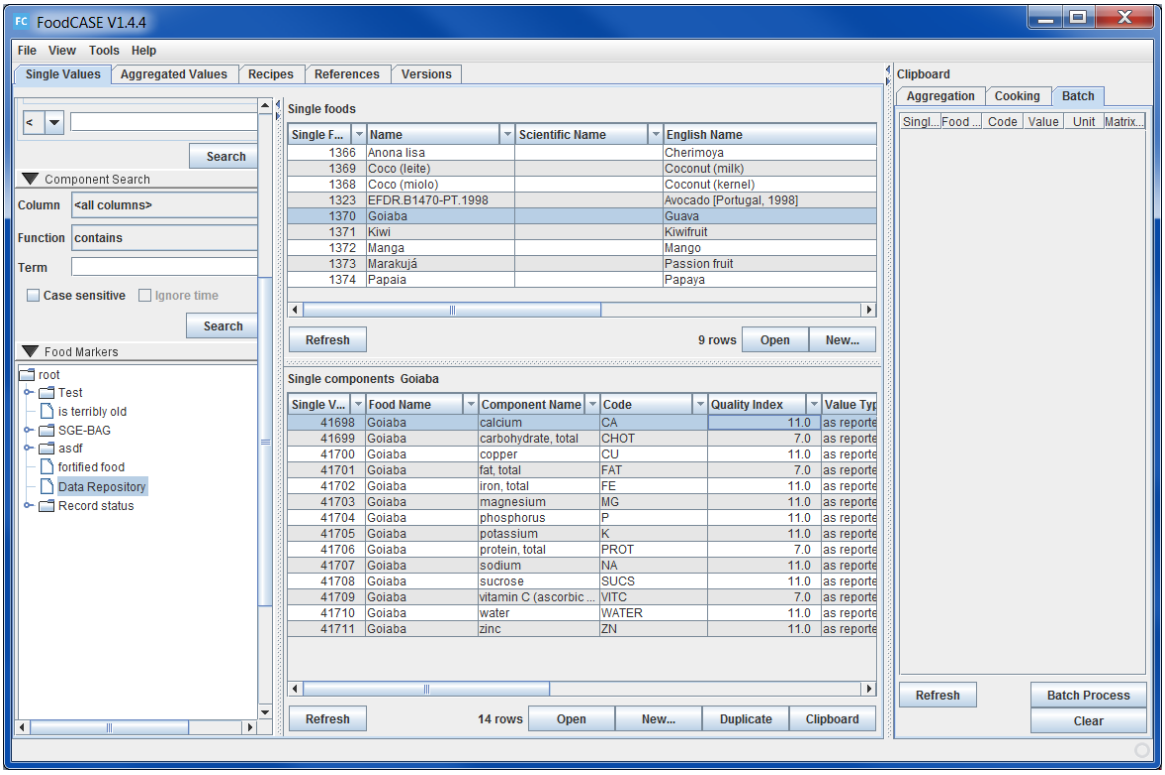


Figure 7.4.1-1

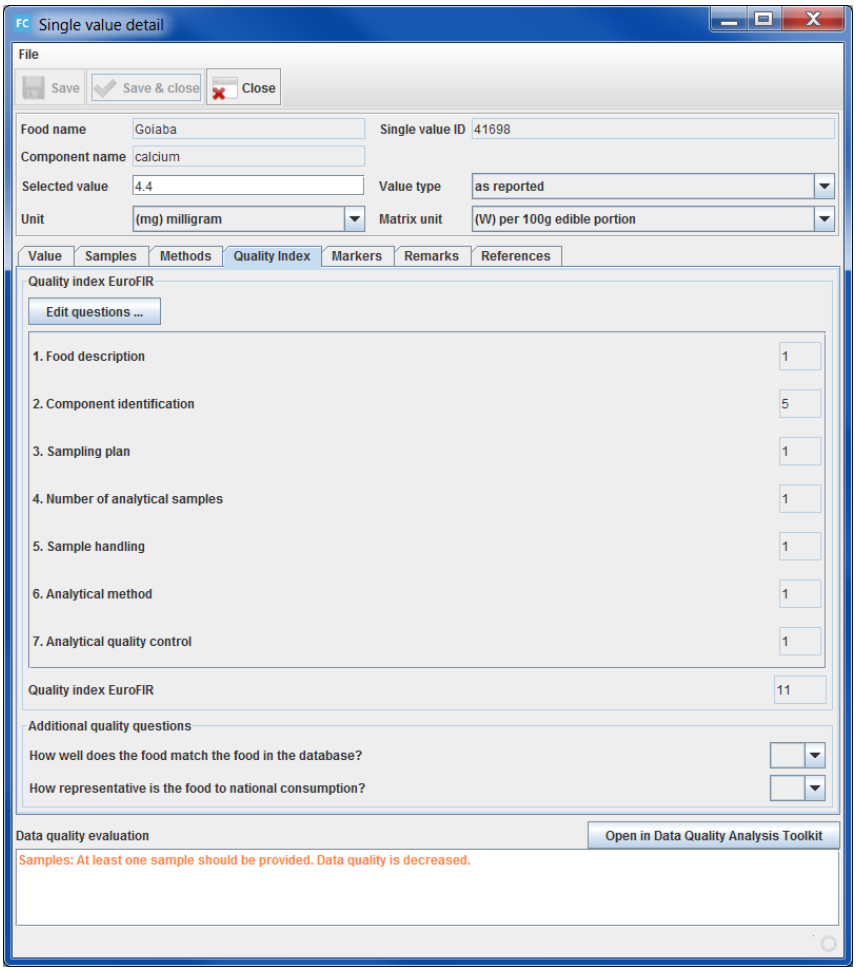


Figure 7.4.1-2

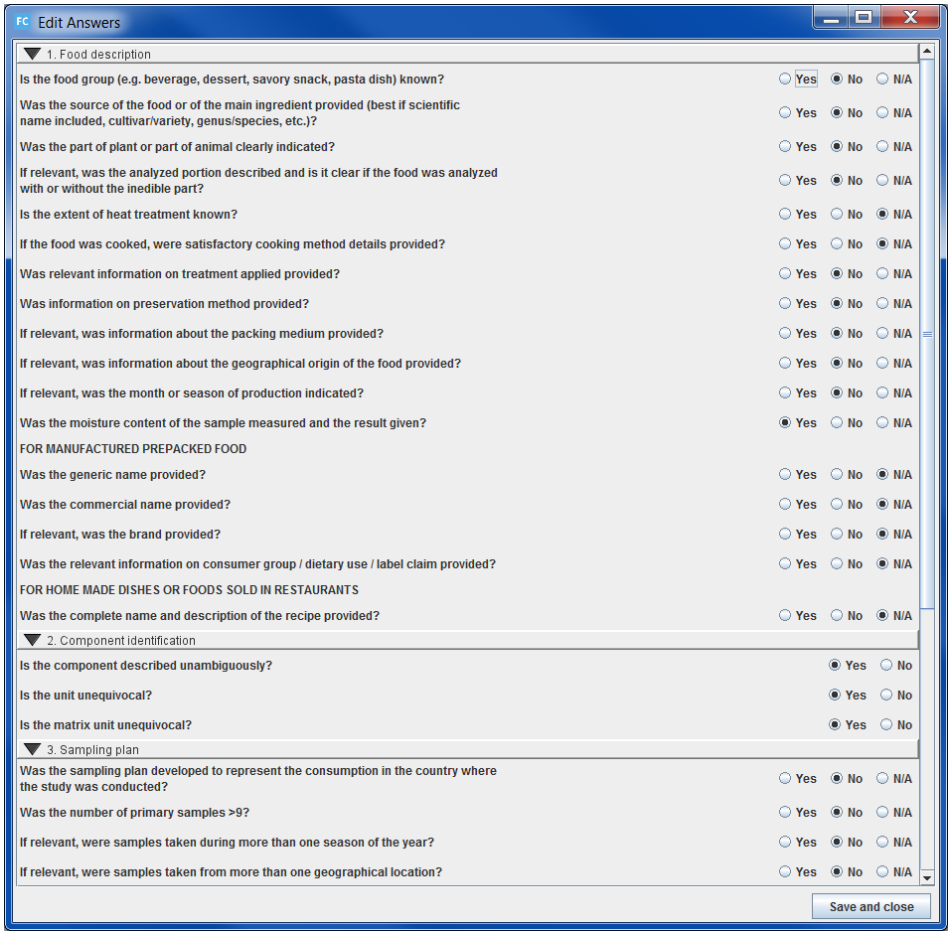

Edit Answers
1. Food description
Is the food group (e.g. beverage, dessert, savory snack, pasta dish) known?
Was the source of the food or of the main ingredient provided (best if scientific name included, cultivar/variety, genus/species, etc.)?
Was the part of plant or part of animal clearly indicated?
If relevant, was the analyzed portion described and is it clear if the food was analyzed with or without the inedible part?
Is the extent of heat treatment known?
If the food was cooked, were satisfactory cooking method details provided?
Was relevant information on treatment applied provided?
Was information on preservation method provided?
If relevant, was information about the packing medium provided?
If relevant, was information about the geographical origin of the food provided?
If relevant, was the month or season of production indicated?
Was the moisture content of the sample measured and the result given?
FOR MANUFACTURED PREPACKED FOOD
Was the generic name provided?
Was the commercial name provided?
If relevant, was the brand provided?
Was the relevant information on consumer group / dietary use / label claim provided?
FOR HOME MADE DISHES OR FOODS SOLD IN RESTAURANTS
Was the complete name and description of the recipe provided?
2. Component identification
Is the component described unambiguously?
Is the unit unequivocal?
Is the matrix unit unequivocal?
3. Sampling plan
Was the sampling plan developed to represent the consumption in the country where the study was conducted?
Was the number of primary samples >9?
If relevant, were samples taken during more than one season of the year?
If relevant, were samples taken from more than one geographical location?
Yes
No
N/A
Save and close

Figure 7.4.1-3

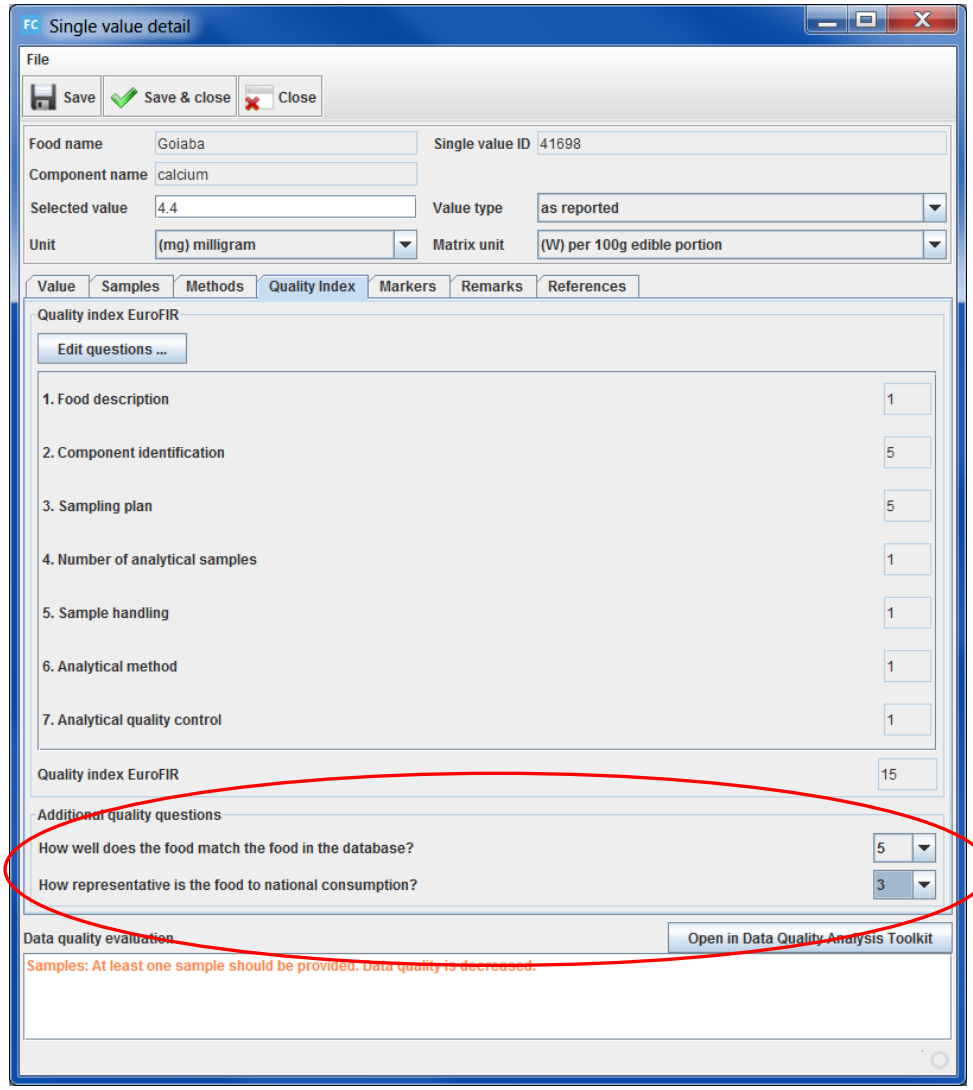

Single value detail
File
Save
Save & close
Close
Food name
Goiaba
Single value ID
41698
Component name
calcium
Selected value
4.4
Value type
as reported
Unit
(mg) milligram
Matrix unit
(W) per 100g edible portion
Value
Samples
Methods
Quality Index
Markers
Remarks
References
Quality index EuroFIR
Edit questions ...
1. Food description
1
2. Component identification
5
3. Sampling plan
5
4. Number of analytical samples
1
5. Sample handling
1
6. Analytical method
1
7. Analytical quality control
1
Quality index EuroFIR
15
Additional quality questions
How well does the food match the food in the database?
5
How representative is the food to national consumption?
3
Data quality evaluation
Open in Data Quality Analysis Toolkit
Samples: At least one sample should be provided. Data quality is decreased.

Figure 7.4.1-4

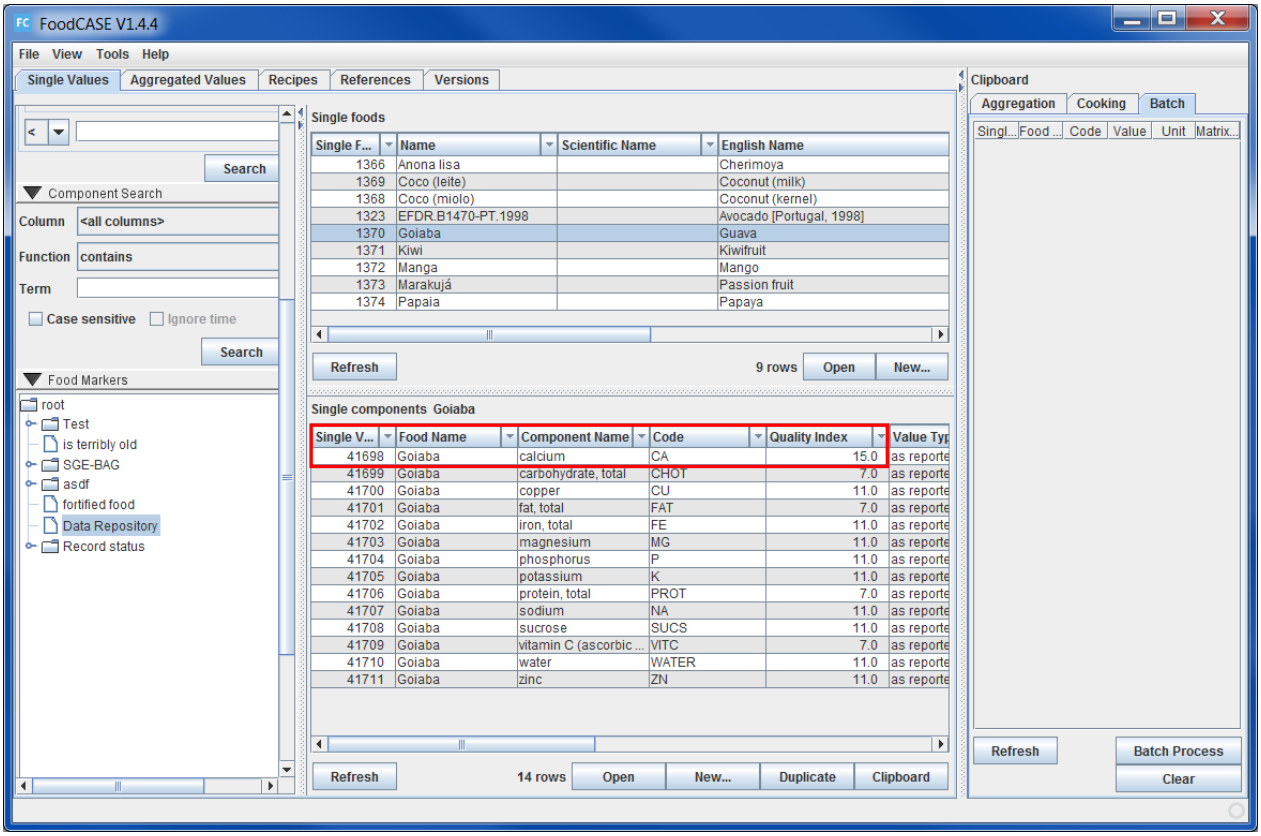


Figure 7.4.1-5

7.4.2 Confidence Code

Confidence code (CC) represents data quality of an aggregated value. It is derived automatically for an aggregated and recipe value from quality indexes and confidence codes of contributed values, respectively (Figure 7.4.2).

In FoodCASE following scale is used to derive a confidence code:

Table 1

CC	Range of QI
A ++	35 – 34
A+	33-31
A-	30-29
A--	
…	
…	
D--	

To be completed…

The final quality of aggregated value cannot be improved unless quality of contributing values is improved. As soon as contributing value increases its quality index confidence code can be recalculated. Recalculation of confidence code is conducted via *Menu Tools → Recomputation.* Follow the procedure in the chapter *6.2.9 Recomputation of Aggregated Food and Recipes.*

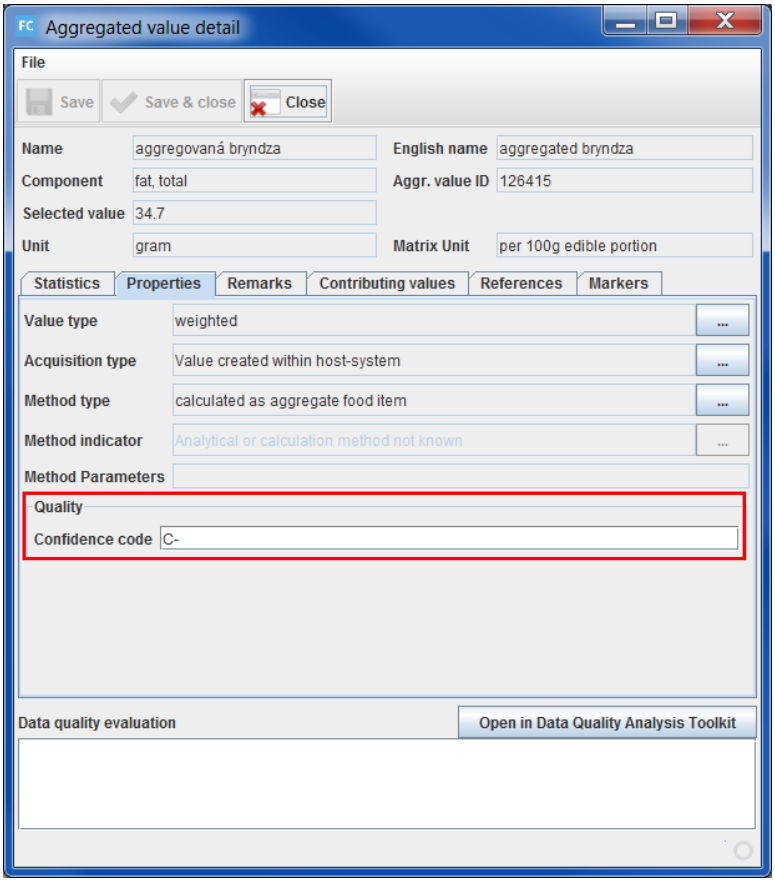


Figure 7.4.2: Confidence code for aggregated food is generated by FoodCASE

(Note: Access to the buttons and confidence code in this window must be blocked)

7.5 Data Quality Analysis Toolkit

Data Quality Analysis Toolkit is an extra FoodCASE module (Figure 7.5) in which user can analyze results of the data quality assessment from various aspects (e.g. data consistency check at different database levels, mandatory information, check on summation if all nutrients give 100, etc.).

Assessment can be run only in FoodCASE Administration Tool over the whole database and on a current database version. In the Administration Tool there are also parameters (requirements) for data analysis defined and periodicity of the assessment can be set by timer to be regular. When timer is set, analysis can run automatically without need to start up any of the applications (see *User Manual for Administration Tool of FoodCASE*). That means that while only

administrator is authorized to set parameters and timer to run the analysis, the results of the assessment can be whenever analysed by compilers in Data Quality Analysis Toolkit.

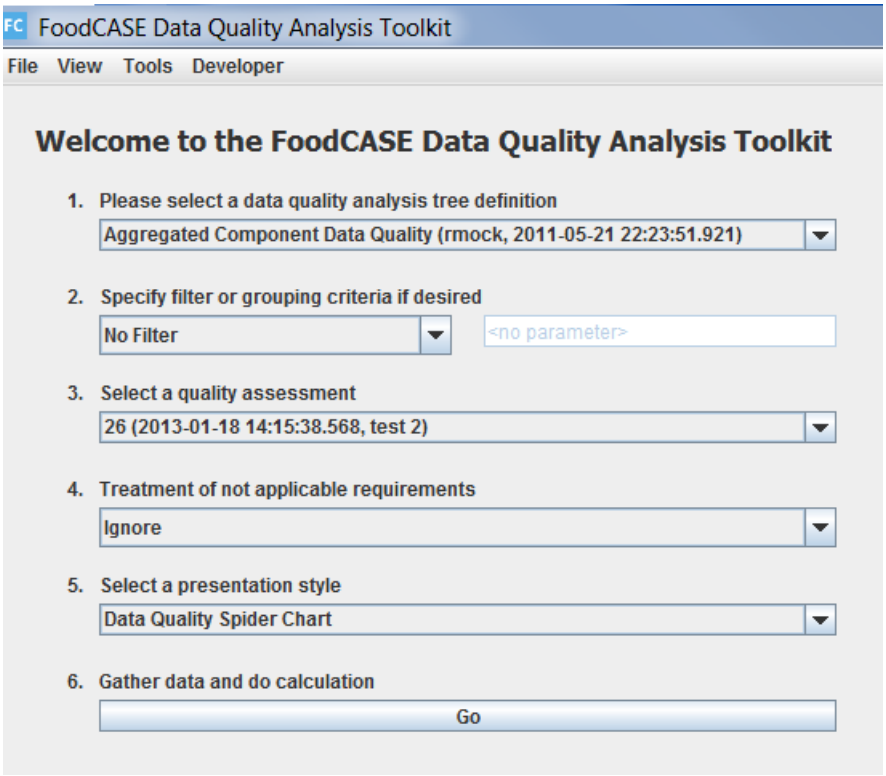
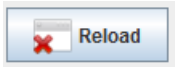


Figure 7.5: Main window of the module for data quality analysis

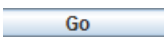
7.5.1 Graphic Controls of Data Quality Analysis Toolkit

In general, the same graphic controls are applied in this module, which are used in FoodCASE Compiler Client (see chap. *4.1 Graphic Controls*). There are some few others specific for this module:

Validate – checks structure of a data quality analysis tree in order to confirm the propriety of the evaluation framework.



Reload – discards changes carried out in an existing data quality analysis tree and reloads the initial structure of the tree.



Go – extracts data based on selected criteria from the database and makes data quality analysis in accordance with chosen data quality analysis tree.

View – buttons show various graphical presentations of data quality in a particular data quality analysis

Tree Table – data quality table view shows the statistical properties of the selected tree node (requirement) and its children in tabular form.

Table – shows a problem table in which all data for the selected node (requirement) have a quality less than the threshold specified. User can change the threshold.

7.5.2 General Functionalities of Data Quality Analysis Toolkit

Most features from FoodCASE Compiler Client are applicable for this module (e.g. column customisation, context menu). There exist also some functions designed solely for this module. They are adequately explained in the *View Description* or *Help* window located on the right panel of the user interface.

- By moving the slider to the right or to the left user can zoom in or zoom out the tree view (Figure 7.5.2-1).

Figure 7.5.2-1

- By left click and drawing the cursor up and down the chart user can change the scale range (Figure 7.5.2-2).

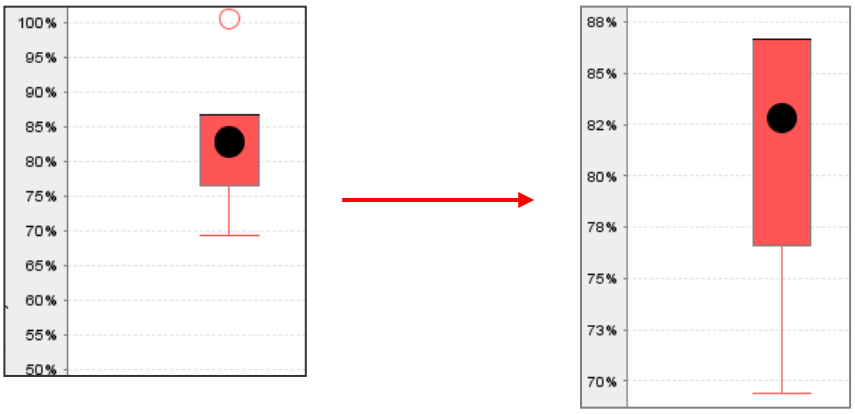


Figure 7.5.2-2

- Right click on a node opens context menus to switch to another view or (un)collapse the tree (Figure 7.5.2-3).

- Tooltip table appears when user positions the cursor over a node (Figure 7.5.2-3).

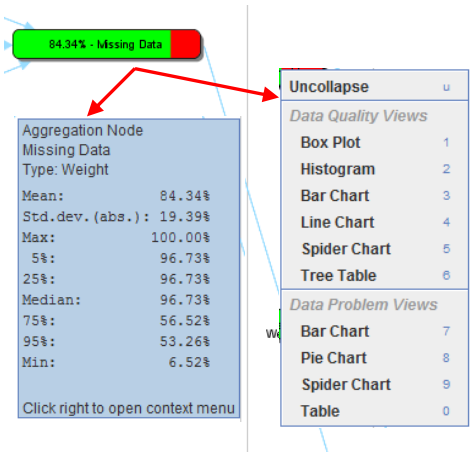


Figure 7.5.2-3

- Using the **radio** button (**Vertical/Horizontal Plot** and **Rotate**), user can change view of a presentation to vertical or horizontal position (Figure 7.5.2-4).

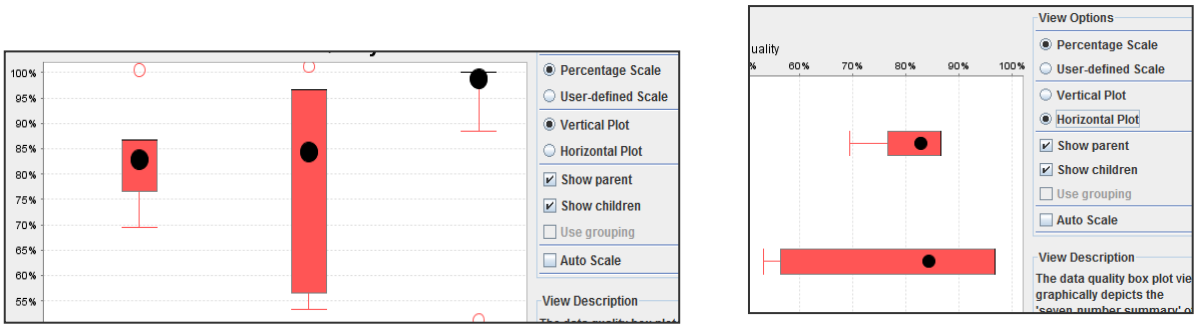


Figure 7.5.2-4

- Click on a particular colour sector/bar of a chart displays contributing requirements (nodes) and their analysis (Figure 7.5.2-5).

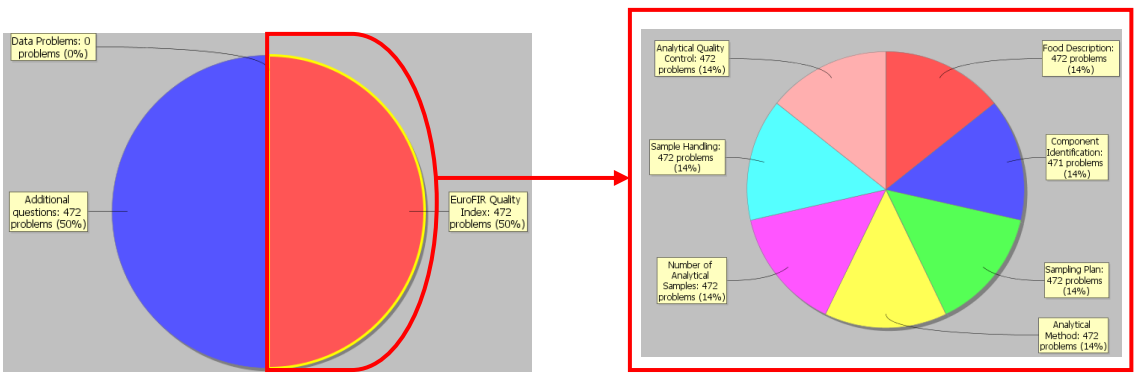


Figure 7.5.2-5

- Click on a parent node in the displayed branch of the tree reloads graphical presentation of a higher level of the tree.

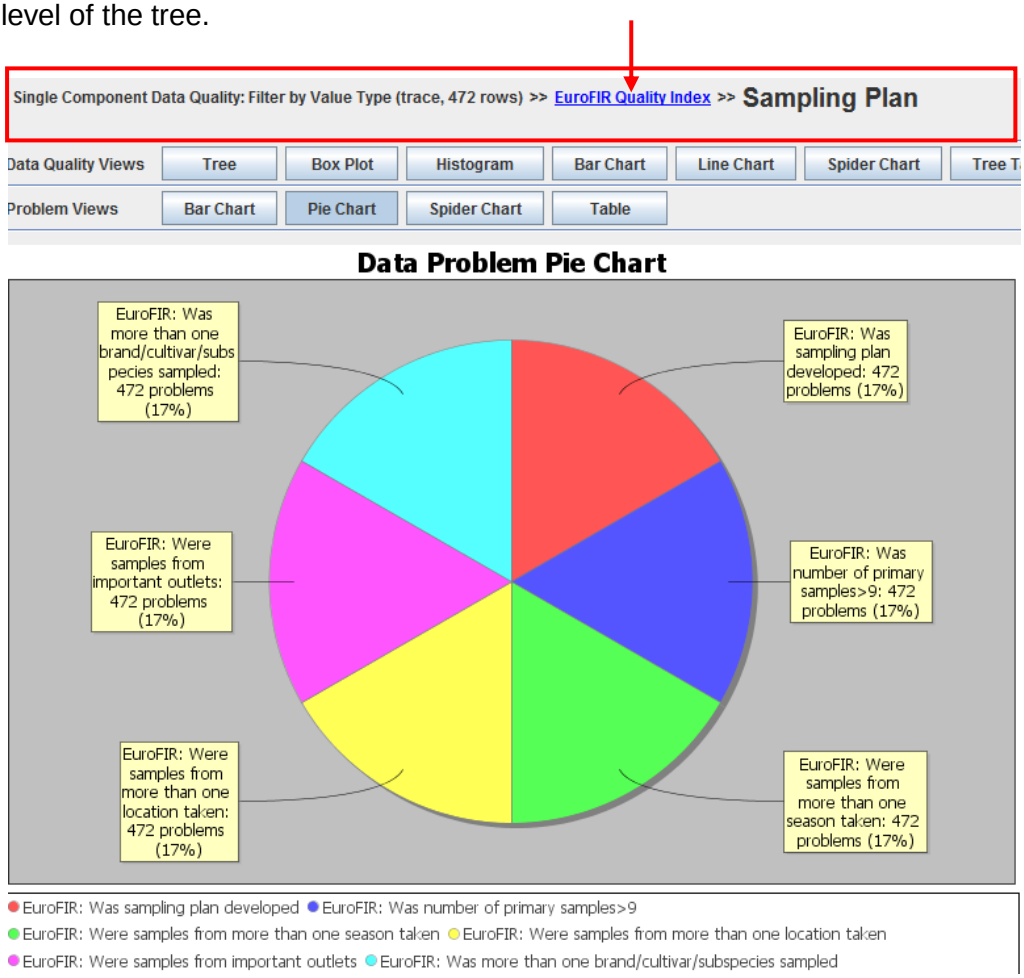


Figure 7.5.2-6

- For quick operation with nodes, keyboard shortcuts are displayed in the right bottom corner of the window (Figure 7.5.2-7).

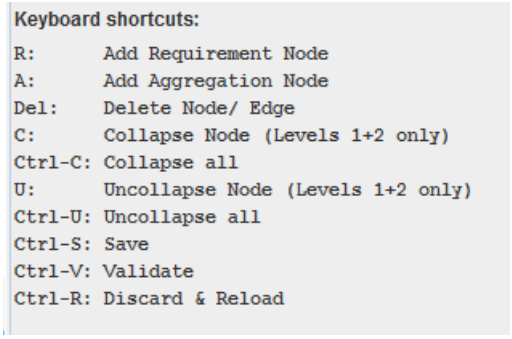


Figure 7.5.2-7

- In the tree view proportion of data that meet given requirement of a node is expressed in per cent and in green colour in contrast to the red colour representing the data that do not meet defined requirements (Figure 7.5.2-8).

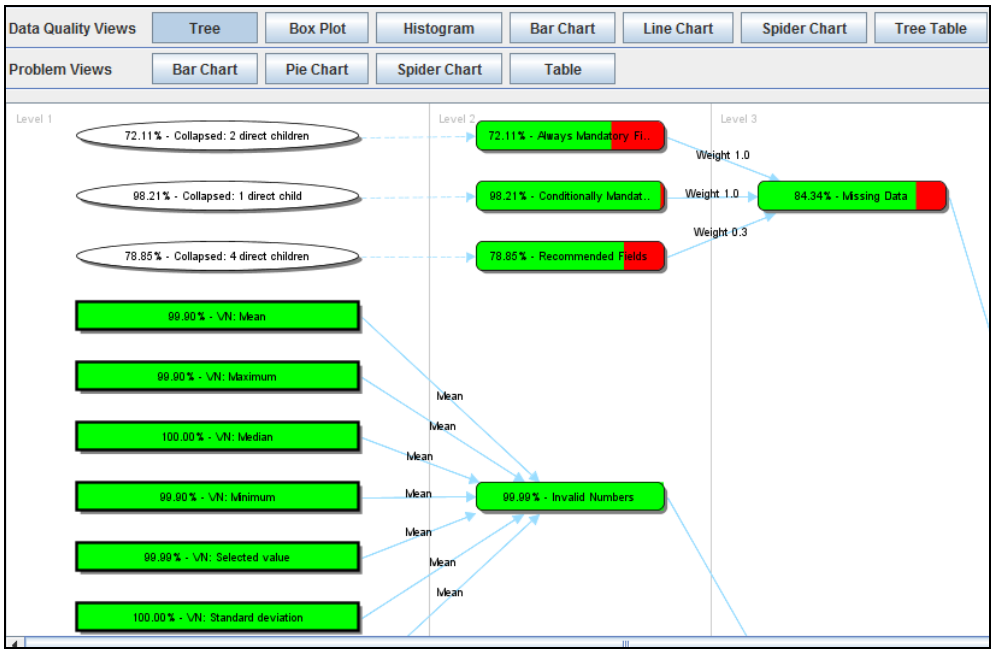
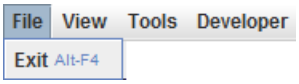


Figure 7.5.2-8

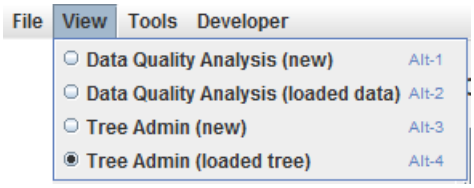
7.5.2 Menu File



Exit (Alt+F4)

Click the *Menu File → Exit (Alt+F4)* or use of the **Alt+F4** keys closes the module for data quality analysis, however main FoodCASE application remains open.

7.5.3 Menu View



Data Quality Analysis (new)

Here compiler defines parameters from the existing lists for the own analysis like it is entity or name of the tree definition, version of quality assessment, presentation style (Figure 7.5) and activates the calculation.

Data Quality Analysis (loaded data)

Displays currently loaded data analysis with defined parameters and tree.

Tree Admin (new)

Compiler defines name and own structure of a tree which is going to be used for data analysis. The tree is assigned to a particular entity (e.g. single components). Tree can be duplicated and modified, renamed or deleted (Figure 7.5.3-1).

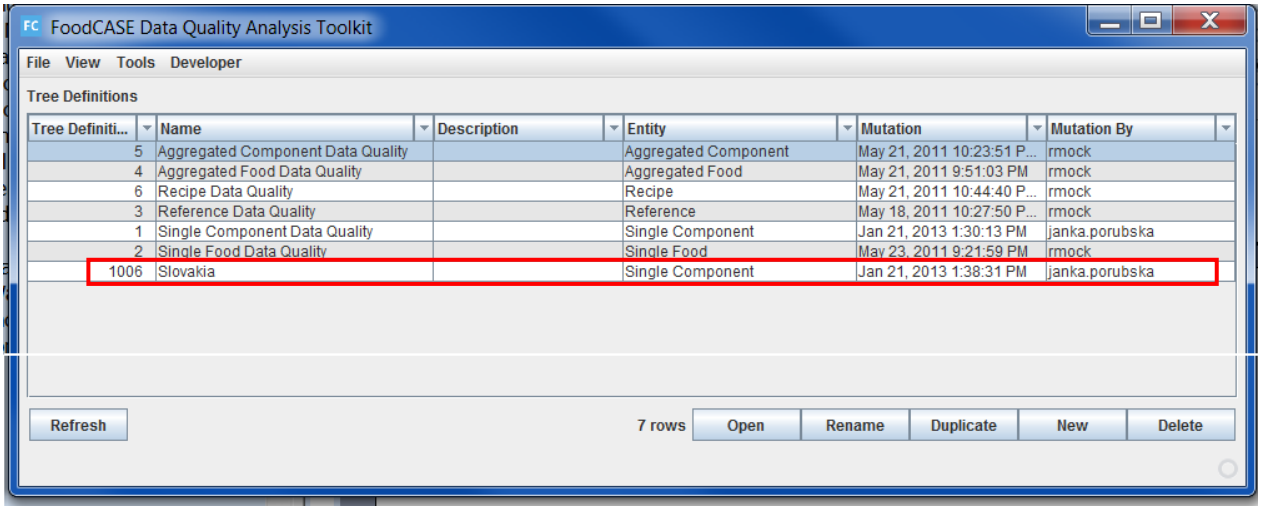
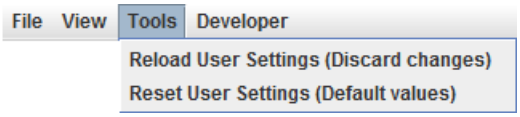


Figure 7.5.3-1: New tree definition “Slovakia” was added for single component entity

Tree Admin (loaded tree)

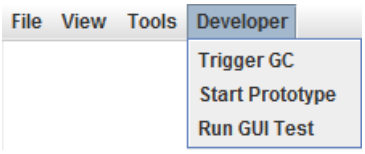
Displays currently loaded data analysis tree. The existing tree can be modified here.

7.5.4 Menu Tools



To be completed…

7.5.5 Menu Developer



To be completed…

7.5.6 Creating Data Quality Analysis Tree

Data quality analysis tree is an arrangement of individual qualitative requirements. The arrangement in the tree structure helps you to group qualitative requirements with similar properties and set different rate of importance and contributions of a requirement or a group of requirements for the total quality analysis (by using various statistic operations, e.g. weight).

Procedure for tree creation

1. Click the *Menu Tools → Data Quality Analysis (Ctrl+D)* in FoodCASE Compiler Client application to start up the extra module on data quality (Figure 7.5.6-1)
2. Click the menu *View → Tree Admin (new)* to add own data quality analysis tree (Figure 7.5.6-2)

3. Click the **New** button to add name and entity for your own tree (Figure 7.5.6-3)
4. Click the **Save and close** button to save the tree
5. Set cursor on the newly created tree and click the **Open** button to open the *Tree Editor* (Figure 7.5.6-4)
6. From the existing nodes (that are defined in the Administration Tool) listed on the left panel of the window select individual requirements to the central part of the window by using drag & drop operations
7. For creation an aggregation node use right click on the *"Level 2"* or higher level and add its name and set properties in the right panel of the window (Figure 7.5.6-5)
8. Create edges by clicking the left mouse button on an aggregation node and dragging it towards a requirement node (Figure 7.5.6-6)
9. Check the validity of the tree by clicking the **Validate** button
10. If an error message displays, click the **OK** button and make corrections in the tree (Figure 7.5.6-7)
11. When tree is ready and validation is successful click the **Save** button to store the tree to the database. The created tree can be modified or duplicated.

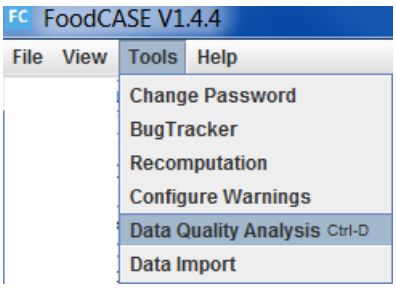


Figure 7.5.6-1: Menu in FoodCASE Compiler Client application

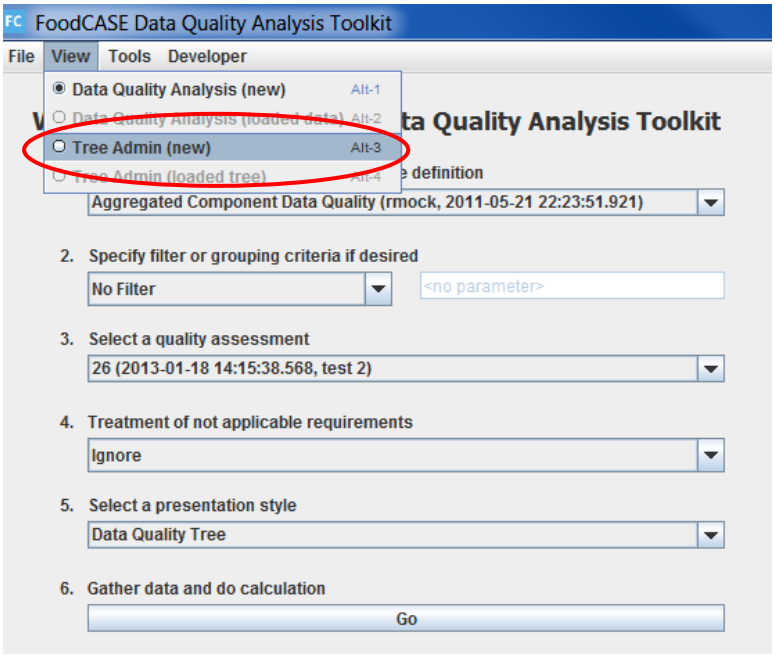


Figure 7.5.6-2: Menu in FoodCASE Data Quality Analysis Toolkit

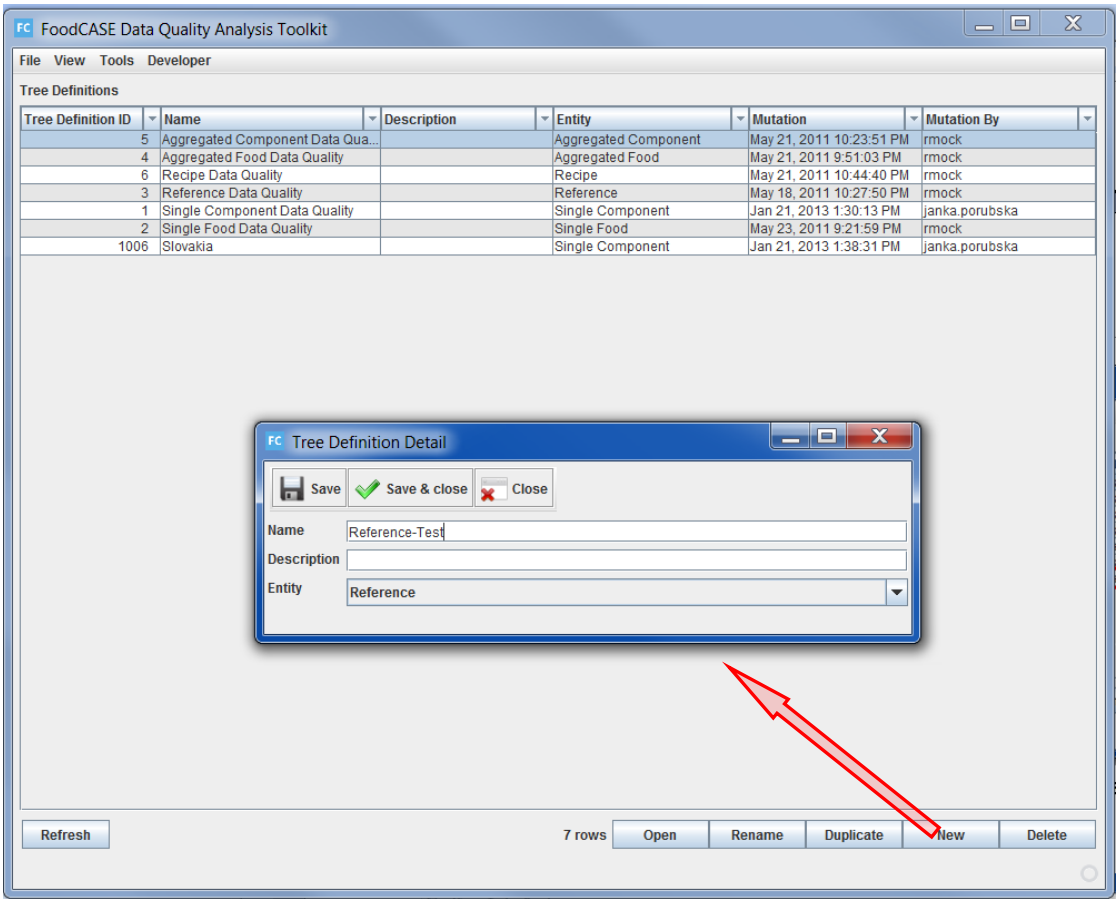


Figure 7.5.6-3

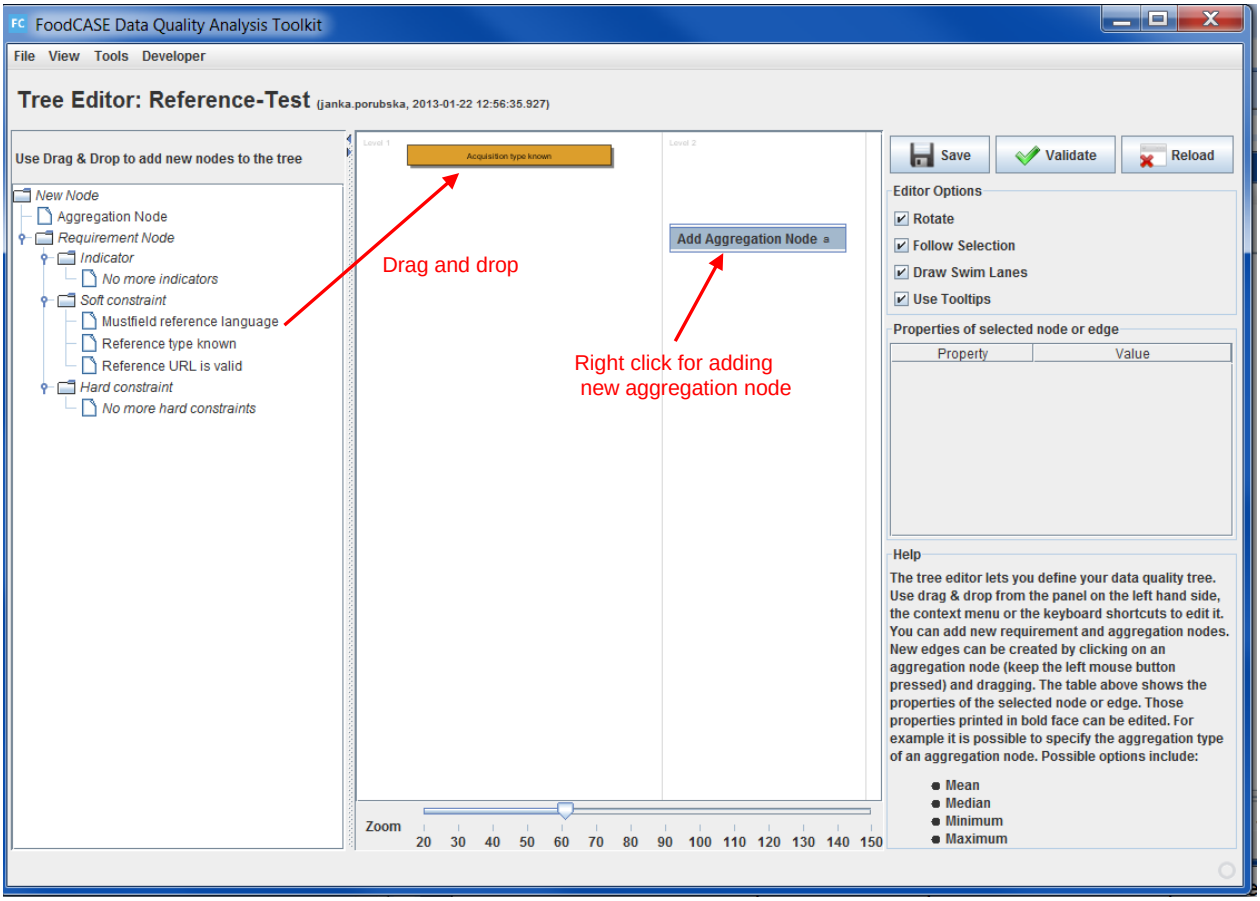


Figure 7.5.6-4: Only 4 nodes exist for analysis of reference quality

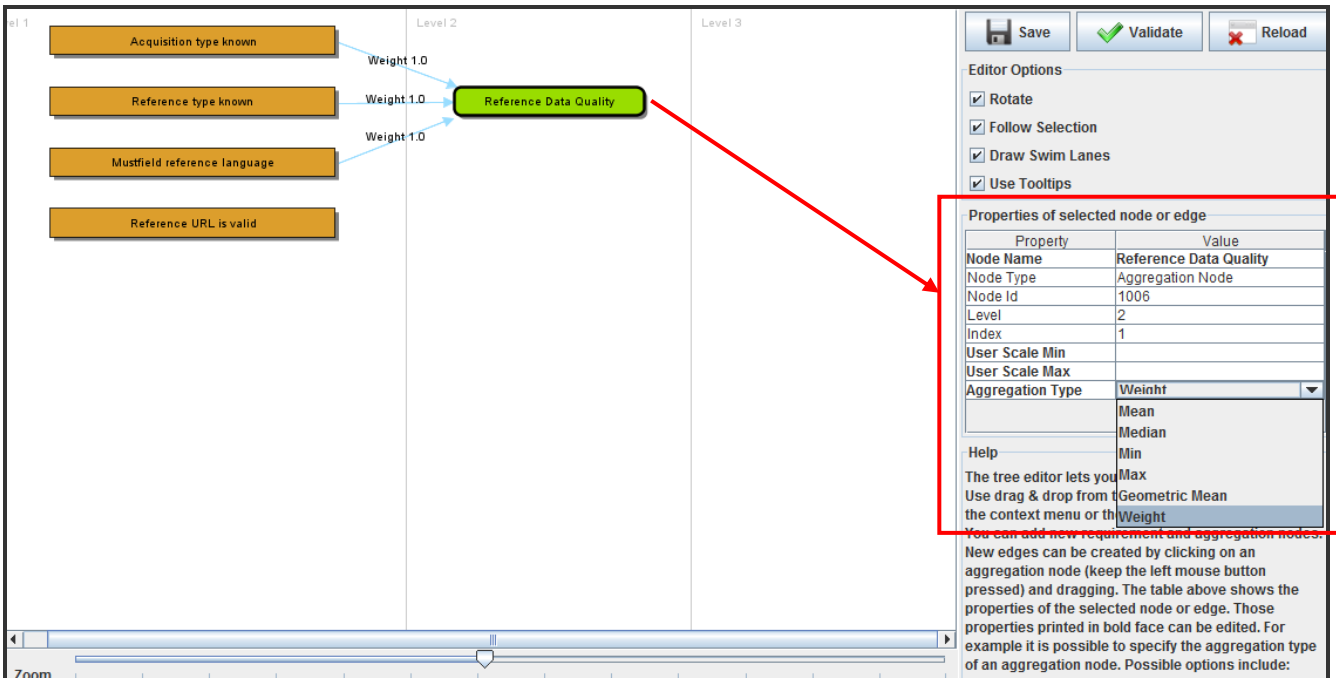


Figure 7.5.6-5: Properties of a node can be modified

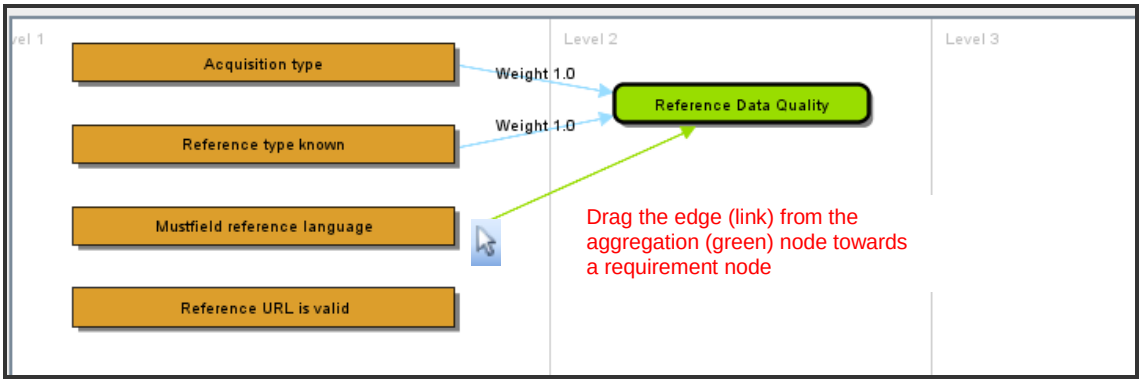


Figure 7.5.6-6

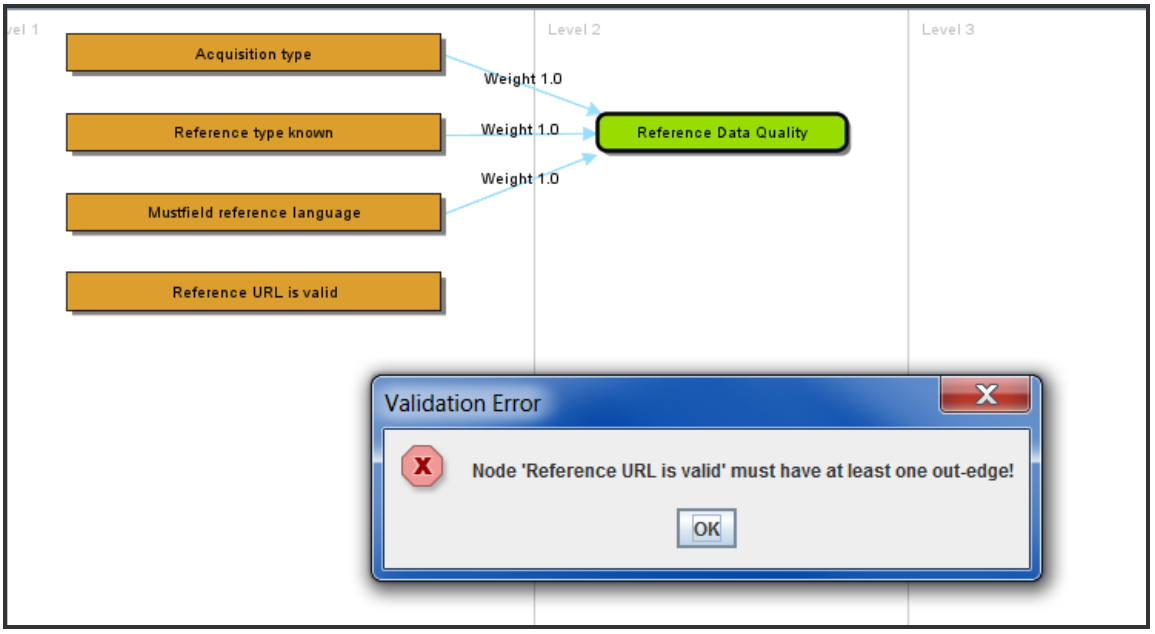


Figure 7.5.6-7

7.5.7 Analysing Data Quality

Data quality assessment is conducted on a particular database version and is trigger out in FoodCASE Administration Tool. Each assessment is stored as an individual record and can be analysed further by applying different data quality analysis trees.

Procedure for data quality analysis

1. Click the *Menu Tools → Data Quality Analysis (Ctrl+D)* in FoodCASE Compiler Client application to start up the extra module on data quality (Figure 7.5.6-1)
2. Select a tree from the existing data quality analysis trees (1) according to which you want evaluate data; tree is usually applicable for a certain entity (e.g. single values, references, etc.) (Figure 7.5.7-1)

3. Define other parameters:
   - (2) set a filter or a group on data which you want analyse (e.g. select only data with acquisition type *"Scientific communication"*); number of records for filtered data package is included
   - (3) select a quality assessment which represents database of particular version and date
   - (4) decide how you will treat information that are marked in the database as not applicable in your analysis
   - (5) presentation style (Figure 7.5.7-2)
4. Click the **Go** button and wait until the data extraction and analysis is finished based on selected criteria
5. There are many options how to present using different **View** buttons and analyse data; one can:
   - choose a graphical presentation of the results (Figure 7.5.7-3)
   - identify problematic records and correct them or complete missing information (Figure 7.5.7-4)
   - show the statistical properties of the selected tree node and specify threshold for evaluated records

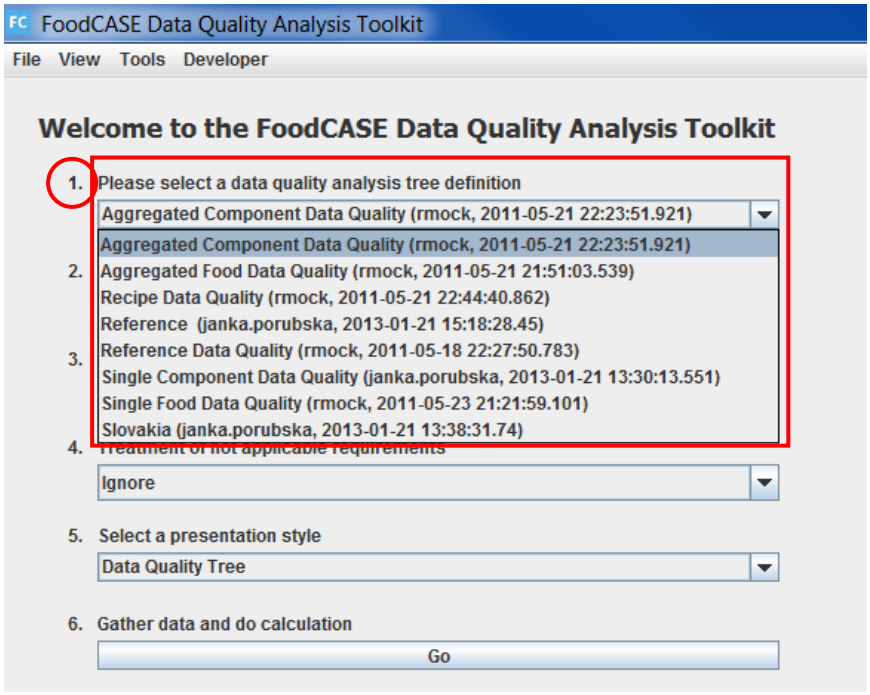


Figure 7.5.7-1

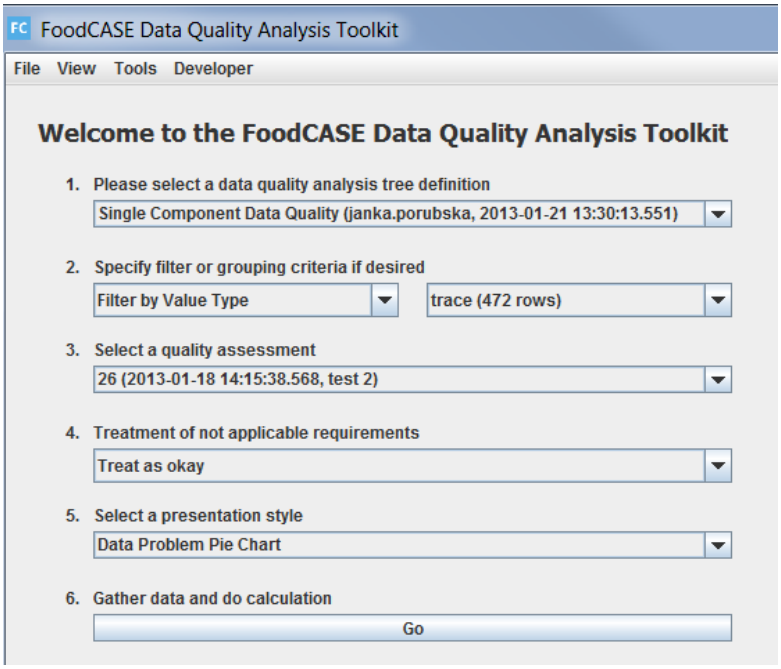


Figure 7.5.7-2: Example of defined criteria for data quality analysis

Figure 7.5.7-3: Some of the possible graphical presentations of data analysis

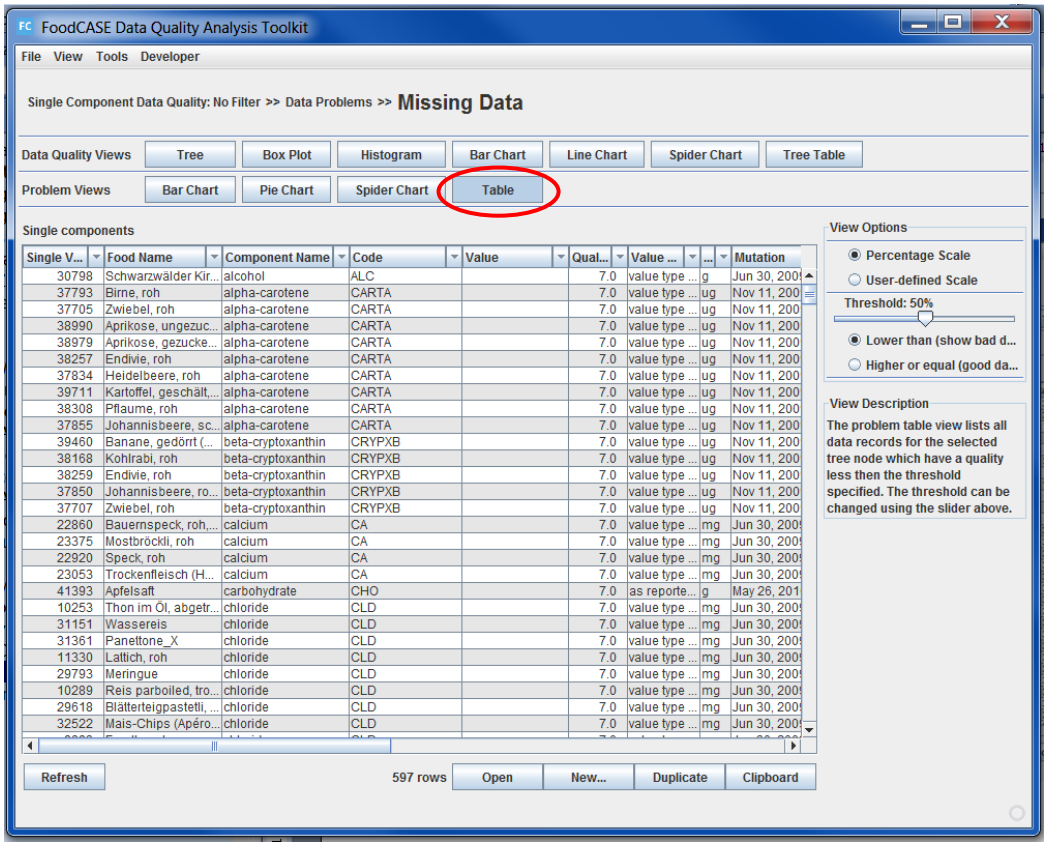


Figure 7.5.7-4: Missing data are listed in the table and can be modified by using the buttons at the bottom

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Williamson C.S. and Buttriss J.L. (2007). EuroFIR Congress 2006: Food Information Databank Systems – everything you ever wanted to know. Trends in Food Science & Technology, 18 (8), 398-406. (DOI 10.1016/j.tifs.2006.10.023).